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THE GAS JOURNAL

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EDITORIAL NOTES

With the B.C.G.A.

UNDER the Presidency of a Gas Engineer and Administrator who is known throughout Great Britain and the Continent of Europe for his valuable work on behalf of the industry, the British Commercial Gas Association last week held their Nineteenth Annual Meeting and Conference, partly in Hull and partly at Bridlington—a division of activities which was dictated not by choice, but by necessity. Nearly twenty years have passed since the first of these gatherings, which was presided over by the late Sir Corbet Woodall; and in 1930 his son, Mr. Henry Woodall, found himself at the head of a national organization that has never once looked back. The foundation stone was well and truly laid; and the edifice which has been built upon it is the pride of the gas industry, as it is the envy of others.

With infinite patience, with unflagging perseverance, with great foresight and enthusiasm, has the B.C.G.A. been brought to be the powerful influence which it now is; and all who have worked unceasingly to this end, with less thought of themselves than of the industry which they serve—and the "JOURNAL" itself claims to be of the number—are rewarded in the result of their labours. Even those who bear the heat and burden of the day—the devoted officers and staff of the Association—can feel that no labour has been in vain. The industry owes them much, and is never likely to repudiate the debt.

This, then, is the organization over which last week Mr. Henry Woodall presided in a way that was deeply appreciated by those who were present.

Service and Competition

IN his Presidential Address Mr. Woodall gave some indication of the extent to which the B.C.G.A. has helped our industry since 1912 to the present day, when the membership represents 96 p.ct. of the entire industry; and he emphasized the value of the co-operation in matters of service and advertising which has been brought about by the Association. The help and advice of the Association are of the greatest value to the small concerns, and through these concerns to the industry as a whole. Bad service in any area lowers the prestige of gas and necessarily decreases goodwill. In the words of the President: "Most of us know people . . . who have nothing but abuse for gas, and I find frequently that these have formed their ideas because of inefficient service received from a company of limited resources. These justifiable grumbles do more harm to our industry than some are prepared to recognize." There is no doubt that, where uniform gas at regular pressure is supplied, consumers are willing to pay a price which will allow of adequate return on capital invested; bad service is the cause of friction more often than high price. These small undertakings are an important section of the industry—far more important than their output in relation to the total output of the country might suggest. It is cheaper in the majority of cases for small isolated communities to generate gas; and whatever process of absorption may take place in the future, it does not follow that the small concerns will cease manufacturing operations. This has been pointed out several times in our columns during the past year; and it was stressed by Mr. Woodall in his address. There exists, in other words, every reason why the small undertakings should concentrate on the rendering of good service in the present.

Mr. Woodall, by quoting the progress during the past forty years of a gas company with which he has been closely associated for half this period, typifies the progress of many concerns of a similar nature. A twelvefold increase in sales, reduced capital per million sold, a new era in supplying comfort to the working-classes—these are among the facts. Compared with forty years ago, to-day a consumer gets ten times the value from the gas he uses for lighting, and double the value from gas employed for cooking and heating; and yet there is this twelvefold increase in sales. The first two facts are really a tribute to the manufacturers and distributors of our main product, and to the enterprise and research of the makers of plant and appliances; the astonishing increase in sales is largely attributable to the excellent work of the B.C.G.A.

The competition which we have to face now from both electricity and oil is great, and it will increase in intensity. We must present a unified front to the attack, and there can be no gainsaying that the B.C.G.A. is a unifying

influence. In regard to this competition, Mr. Woodall spoke of public lighting. In many places where the local authority owns the electricity undertaking, gas supplied by private enterprise is being displaced at great expense and for no apparent benefit. Norwich and Ipswich serve as examples; gas for public lighting is being rapidly wiped out in these places. In Tottenham, where the gas and electricity are in the hands of rival companies, 96 p.ct. of the street lighting is effected by gas; in Birmingham, where the Corporation owns both gas and electricity undertakings, there are 63 gas lamps to every electric one. Local authorities who own the electricity undertaking only are presenting a type of competition which is indeed difficult to overcome, particularly as part of the funds is derived from the local gas concern; and the public are too frequently not consulted as to their wishes. Mr. Woodall mentioned that, in an undertaking he recently took over, electricity had been introduced for lighting in 1124 cottages. A canvass of the tenants resulted in 368 reverting to gas; and daily more "lost sheep" are being recovered. The provision of electricity in such circumstances can hardly be a business proposition to the suppliers of current; the only thing it can accomplish is to render the provision of gas also very little of a paying proposition. This example cited by Mr. Woodall gives added point to Sir David Milne-Watson's suggestion in his Presidential Address to the Institute of Fuel last month—that a wider vision of the services of gas and electricity would in many instances lead to greater efficiency by avoiding sales at unremunerative prices, in order to secure business, and would at the same time increase the satisfaction of the consumer. The example also indicates the need for such national propaganda work as is carried out by the B.C.G.A. to inform the public of the claims of gas and its powers of giving modern service coupled with economy.

An Example of Fair Competition

BIRMINGHAM owns both gas and electricity concerns, and few places could point to a broader and more co-operative policy than that of the Birmingham Corporation in the matter of public services. This is due largely to the sterling work of Alderman J. H. Lloyd, Chairman of the Gas Committee, during whose association with the Committee the output has increased from 4000 to 14,000 million c.ft. His paper before the B.C.G.A., we suggest, ought to be broadcast among all councillors throughout the country; it is a plea for, and justification of, a "fair field and no favour" for gas and electricity; it is a plain statement of facts which should help to shatter many false notions as to the position and value of the gas industry. There is no doubt, he says, that the strides which have been made in developing the efficiency of electricity as a lighting agent have led many people to expect that sooner or later there will be a corresponding advance in its efficiency as a source of heat. "On this completely unfounded belief are based hopes that are doomed to disappointment." Lack of appreciation of the value of gas to the community has already misled public administrators into costly errors—errors upon which, however, the limelight is not directed because the public's idea, fostered by vote-catchers, of the claims of electricity is exaggerated.

Alderman Lloyd does not theorize; to prove the validity of his statements he points to results accomplished in Birmingham. Gas can be regulated as to the measure of heat to be given in cooker or fire more easily and more economically than electricity; and this economy and ease of regulation have been, and are likely to be in the future, of the utmost importance to the manufacturers of Birmingham—"the city of a thousand trades." In this city some 1200 different industrial processes are carried on, in all of which heat is required. Many of these, explains Alderman Lloyd, are in their very essence dependent on the existence of gaseous fuel; and if it were not available a radical alteration in the processes would be inevitable. The introduction of gaseous firing has also enormously improved the conditions of workers in factories. As in factory, so in the home, gas has alleviated the lot of the worker. The working woman can now be a cook instead of a stoker. To what extent Birmingham is endeavouring to serve the working-classes is indicated by Alderman Lloyd's outline of the scheme whereby installation costs are recouped by setting the prepayment meter to give a reduced quantity of gas per penny until the liability is liquidated. The scheme was inaugurated early last year, and to date it has resulted in the installation of gas in no fewer than 18,000 houses, many of them in the poorest parts of the city.

It is the duty of municipalities to encourage the use of smokeless fuels; and they ought to bear in mind that the gas industry offers two such fuels, one solid and the other gaseous. And as Alderman Lloyd observes, much can be accomplished by close co-operation and sympathetic working between the various corporation departments. It should be recognized that by purchase of the gas undertaking's "residuals" they are helping to reduce the price of gas. In addition to using gas for street lighting, they can use coke for all heating apparatus in schools and other public buildings, sulphate of ammonia for agricultural land, parks, gardens, and so on, and tar for the roads. The use of smokeless fuels represents a great saving to municipalities. It is estimated, for example, that a decrease in the refuse put into the dust bin of 1 lb. per household per day would result in a saving of £30,000 per annum to the city. What an excellent point in favour of the coke boiler! Municipalities must realize that electricity can never fulfil all the services of the gas industry, and that the latter industry is only starting on its career of public service. Alderman Lloyd's paper will help to bring about this realization, and with it more effective co-operation, greatly to the benefit of the community.

One of the points emphasized by Alderman Lloyd is that gaseous heating is healthier than electrical heating because the gas fire ventilates the apartment in which it is fitted. This great advantage was also stressed by Dr. Elizabeth C. Mudie, who gave a "Woman Doctor's Views on Gas in Relation to Hygiene." Her experiences, outlined in her paper, are valuable testimony to the virtues of gas in the home. Her reply to patients and friends who ask her whether gas fires are healthy is this: "I have five of them in my own house." Dr. Mudie explained to those present at the B.C.G.A. conference that, "during student days, for lighting, heating, cooking, and ironing, in a small flat of three rooms—kitchenette and bathroom, my bills never exceeded the sum of 4s. weekly, even when gas was at a high rate. I could not have heated and cooked with less than two hundredweight of coal; this would have cost four to five shillings, and there would still have been the lighting account, a very considerable item with students. What was saved in cleaning and washing cannot be accurately gauged." Dr. Mudie also referred to the heating effect of gas lighting.

Achievement and Appreciation

THE man who achieves must always command admiration. Hero worship is as keen and prevalent to-day as it ever has been, and even under the prosaic and ordinary exterior of the rank and file of the great majority the blood stirs and the heart beats faster when we learn of and appreciate fine achievement. "Men are seldom underrated; the mercury in a man finds its true level in the eyes of the world just as certainly as it does in the glass of a thermometer."

Many fine and heroic acts and efforts are accomplished in obscurity, without the stimulus of public applause; sometimes, in fact, in the face of opposition and misunderstanding. Difficulties have a way of developing culture and character. The hard job and the strenuous and sustained strain of effort have, all down the ages in all sorts and spheres, produced outstanding men with the power to get things done and to gather round them those who will co-operate and assist in their adventures. Their outstanding achievements have commanded, and always will command, the admiration of their fellows. Modern life is as full as ever of adventure, and a business career holds out a myriad magic wands to open doorways to other than merely financial success.

To few, even of the outstanding men in a nation, comes a Knighthood from the King as a public seal on fine achievement, as well as the higher mark of confidence in anticipation of important work still to do. This makes the honour bestowed on Francis Goodenough all the more

significant. The endorsement by two Ministers of Education in very different Governments marks the public confidence he has inspired.

One of the most gratifying and delightful aspects of the public recognition that has come to Sir Francis, as revealed at the special function and presentation to him at the B.C.G.A. Annual Conference last week, was the spontaneous and unanimous spirit of goodwill and personal friendliness which was so evident on that occasion. This was not only indicated by the tangible tokens and mementoes of an industry's appreciation of his work and of the honours so well won by intense energy and outstanding qualities, but by the spontaneous and remarkable demonstration of personal friendship and esteem. This latter is surely the greater achievement, for the tangible honour, without the love and goodwill of his lifelong colleagues, would, as Sir Francis himself said at Bridlington, be empty indeed. No more sincere wish could have been expressed than that he will long continue to give his best to the building and safeguarding of the gas industry, as well as to the more herculean task of helping to find solutions to problems of the nation in its present time of great need.

The confidence that he carries the goodwill and personal affection of such a host of appreciative friends will, we are certain, be an added inspiration to him.

The Education of Gas Salesmen —A Great Step Forward

THE Hull Conference will be memorable—perhaps historic would not be too big a word to use—for more than one reason. The luncheon to Sir Francis Goodenough on the Tuesday will not be easily forgotten by those fortunate enough to be there, for, as we have already indicated, it demonstrated unmistakably and in most happy fashion the spirit of comradeship that has characterized the relations between the Executive, the Officers, and the members of the Association, and between all of them and their Chairman, for close on twenty years. And that demonstration of appreciation of the services rendered by the Chairman throughout that long space of time, came at a very apt moment; for they were the prelude to a striking illustration of the character of those services, to a timely proof of the fact that those services continue to be given, and to a welcome promise that they will continue and grow in value.

The paper which Sir Francis Goodenough read to the Conference in the hall of Hull University College the following (Wednesday) morning marks, we are convinced, a great step forward in the development of Salesmanship in the Gas Industry. It is, first of all, a clear proof—if proof were needed—that, while he has been studying the problem of Education for Salesmanship for the nation, Sir Francis has had well in his mind the needs of his own industry, which now gets the benefit of his consideration of the subject. In the second place, it provides a survey of the whole problem of the education and training of the Sales and Service Staff, which will be of great value to every administrator of every gas undertaking. In the third place, it contains recommendations for the establishment of a sound, practical Salesmen's Scheme, as a complement to that of the Institution of Gas Engineers, which will be welcomed by every ambitious gas salesman as well as every progressive gas manager throughout the British Isles.

As Sir Francis was at pains to make clear, the scheme is not yet in its final form, as it has still to be discussed with representatives of the Salesmen's Circles and of the teachers in Gas Supply, and finally to be approved by the General Committee. During that interval—which in view of the urgency of the matter will be as short as circumstances will permit—the Executive will, we know, welcome any comments and constructive suggestions which our readers may send them, as time did not permit of discussion at Hull, nor could discussion then have been much more than superficial with the scheme only just in the hands of many members for the first time.

Let us say here that we are very glad that the Executive took such prompt action to meet the demand for a training course for salesmen which was voiced in these columns by Mr. R. J. Rogers as recently as July last. We are not suggesting that the question was not already well in the minds of the Executive and its Chairman, but some credit is certainly due to Mr. Rogers for helping to bring the kettle to the boil, as well as to the Executive for coming to the point so quickly. We hope and trust that the result will be to have the scheme ready for launching in the early days of the New Year—the most favourable time for salesmen to enter upon a course of training. May we add how glad we are to see the principle of Home-study (which we prefer to the term "correspondence course" for reasons we need not now discuss) introduced into the Salesmen's Scheme. We quite recognize the desirability of class study where that is feasible, but where it is not we believe home-study to be a valuable alternative.

We will not attempt here to cover the whole ground of the masterly survey which Sir Francis Goodenough made of the entire subject of the Pre-employment Education, the Recruitment, the Post-Employment Education, the Practical Training in the Science and Art of Selling—and last but not least—the Pay and Prospects of the Commercial Staff of the Industry. His paper—which is full of meat for a progressive man's digestion—should be read thoroughly and carefully by every director, committee man, and manager in the country. The section dealing with "Recruitment" alone will repay some hours of thought. We will only, at this stage, say that we regard the industry as being under a great debt of gratitude for this call to thought and to action, which of itself alone would make the Hull Conference stand out as a red-letter event in the history of the industry; and we will conclude by quoting from the paper a passage—with our own italics—which we most fully endorse and believe will be endorsed by everyone who has given the subject thoughtful consideration.

"I want to say," wrote Sir Francis, "with all the earnestness of which I am capable, that the progress—I would go so far as to say *the existence—of the gas industry during the next twenty years depends largely upon our realizing to-day the imperative need of modern methods and modern men for the conduct of our undertakings as commercial organizations.* Unless we employ the best weapons, we shall perish in the fight that lies before us—is, indeed, already upon us. *Competition can only be countered by efficiency, and you cannot be efficient unless your staff is efficient.* It has been well said that 'those who do not value trained intelligence are doomed.' This is true alike of the nation, faced with keener and keener foreign competition, and of the gas industry, faced with Government-fostered competition that daily grows in intensity."

Duties and Obligations to the Consumer

THE title of this article is Mr. H. E. Copp's definition of "service" as applied to gas undertakings; and we think it very apt. Service to the consumer, he says, originates in the retort house, is carried through the distribution activities of the undertaking, and ends with satisfactory salesmanship. Such salesmanship is not to be judged by the mere obtaining of orders, for the very last thing which gas distributors should attempt to do is to sell appliances to more or less unwilling purchasers. To ensure satisfaction of the consumer, the gas salesman must know thoroughly of what the appliances he handles are capable, and the specific circumstances and particular conditions under which apparatus of different types should be installed; on the other hand, those responsible for the welfare of undertakings should, by careful attention to raw materials and products made, render the task of the salesman as fruitful as possible by producing cheap gas. This is, of course, obvious; but Mr. Copp puts forward the useful suggestion—useful, at any rate, from the psychological point of view—that a better nomenclature for coke, tar, &c., would be "ancillary products," rather than bye-products or residuals. Looking ahead, the

author rightly asks for concentration on the development of the use of gas in industry, which will entail the employment of salesmen with a sound knowledge of chemistry, physics, and mechanics. "It must be the duty of gas undertakings in this country to take upon themselves the obligation of training such men even at their own expense. The failure to secure such large gas consumptions in this country is largely due to inefficient uses of such apparatus as we have available at present, and the fact that most gas undertakings have not on their staff men possessing the necessary knowledge to demonstrate to manufacturers the multifarious uses to which gas may be applied to their advantage. Consequently, many manufacturers are using other fuels, such as oil and anthracite, when they should be using gas."

That the undertaking of which Mr. Copp is Engineer is rendering good service in its area of supply is obvious from the particulars contained in the paper. An organized system of maintenance, for example, has been in existence since 1910, and the "men are instructed to render every possible service to the consumer in as unobtrusive a manner as possible." This is an important point, and Mr. H. C. Smith, in the discussion, emphasized the need for arranging maintenance schemes so that the maximum amount of service is given by a minimum number of calls. The consumer does not enjoy a continual stream of gas appliance inspectors. At Hull, burner maintenance is carried out by women—an arrangement which has much to commend it on the score of unobtrusiveness alone. Mr. Copp's account of the manner in which he is retaining his lighting load makes good reading, and the charts which demonstrate the constancy of pressure are fundamentally important. The results of all this service to the consumer are well demonstrated in the second appendix to the paper, which is concerned with building operations in the area during the period 1920-29. In an estate of 1442 municipal houses where gas lighting is not allowed, 90 p.ct. of the tenants employ gas for cooking; 90 p.ct. have gas wash-boilers; and 20 p.ct. have one or more gas fires. In another estate, where there are no restrictions as to lighting, 99·7 p.ct. of the tenants have gas wash-boilers; 95 p.ct. gas cookers; and 18 p.ct. one or more gas fires. Privately-owned estates show equally good returns.

Gas in Industry

The paper by Mr. H. H. Creasey is a record of what the Gas Light and Coke Company have achieved in recent years in selling gas to industry, and it is an indication of the enormous possibilities of the industrial field. At the beginning of this century little gas was sold for industrial purposes; last year, in a period of trade depression, the industrial load of the Gas Light and Coke Company was increased from 2398 million c.ft. to 2637 millions—approximately 10 p.ct. And as demonstrating the importance of this load to our industry, the author cites the fact that the average annual consumption at each of the factories and workshops supplied is 273,529 c.ft., compared with 36,975 c.ft., which is the average per consumer in the Gas Light and Coke Company, and 44,391 c.ft. per average ordinary consumer throughout the whole country. There are now nearly 17,000 factories and workshops in the Company's area of supply, and twenty industrial representatives are engaged solely in dealing with these consumers. This number of industrial salesmen is insufficient, but there is difficulty in obtaining enough men with all the qualifications of technical knowledge and selling ability required for this specialized work. There is without doubt an excellent opportunity for young men who determine to fit themselves for such a job. Already over 15,000 factories have been examined; and in Mr. Creasey's opinion the representative who is entrusted with the examination of a factory should be capable of, and responsible for, dealing with all gas fittings and appliances in that factory (excluding engines)—a view with which Dr. C. M. Walter, of Birmingham, who contributed to the discussion on the paper, is not in agreement.

Mr. Creasey's paper is a lengthy document, and we should serve no useful purpose by attempting a comprehensive review of it. Suffice it, therefore, to emphasize that it is essentially a tonic (composed of a number of ingredients, lack of any one of which would spoil its efficacy), and to call attention to one or two points which impress us very much. The first point is the author's insistence on the need for maintenance of appliances; this is even more important in industry than it is in the domestic sphere. Secondly, the diversity of the industrial field, and the fact that an electrical engineering firm is the Company's second largest industrial consumer, with an annual consumption of over 90 million c.ft., should give rise to optimism. Thirdly, gas lighting is by no means dead in industry; a few months ago the Company displaced electricity in a factory because gas lighting proved to be more satisfactory for the particular class of work. Fourthly, the author's observations on central heating are of great interest, and suggest a future tendency. "My Company," he said, "has recently extended to central heating by gas the same scale of discount as we grant for manufacturing purposes. As a result of this concession, the load is now continually growing, and while the figures are, of course, comparatively small, it is pleasing to note that we have now no fewer than 85 consumers who are centrally-heating their premises or residences by gas-fired boilers. Of these 85 there are 10 cases in which we have installed gas-fired boilers for centrally-heating factory premises. As an indication of the value of this new load, I may mention that in 1929 the average consumption per installation for central heating purposes was nearly half-a-million c.ft. per annum." Finally, we call attention to the author's remarks about the use of gas for the preparation of food in works premises, and particularly to the fish-frying load. Though the Company have concentrated on the latter business for a comparatively few years, the results are excellent. There are now 183 fried fish shops in the Company's area of supply using gas-fired furnaces. The total consumption for the past twelve months was 72 million c.ft., or an average of nearly 400,000 c.ft. per annum per installation. Mr. Creasey fully proves his contention that gas is both ancient and modern.

Unemployment Grants

It is encouraging to be able to record that the decision in the case of Seaham Harbour Dock Company *v.* Crook (H.M. Inspector of Taxes)—referred to in our Editorial Columns on May 21 (p. 411) and Oct. 22 (p. 213)—has been reversed by the Court of Appeal. Judgment was given in favour of the Company on Oct. 27 by the Master of the Rolls (Lord Hanworth) and Lords Justices Slesser and Romer, and, for the moment, the law of the land is that such grants are not assessable to income-tax. It is highly probable, however, that, in view of the principle involved, the Crown will take the case to the House of Lords. We are gratified to note that our view has been upheld.

PERSONAL

Mr. W. Scott, of Alloa, has been appointed Engineer and Manager of the Tillicoultry Gas Company, Ltd. He is the second youngest son of the late Mr. J. B. Scott, Engineer and Manager, Gas-Works, Cowdenbeath. Taking up duties with the Alloa Corporation Gas Department in 1921 as Chemist, Mr. W. Scott was appointed Senior Assistant in 1926, which position he has since held.

OBITUARY

The death has occurred of Mr. John Hendrie, who for 39 years was Chairman of Galston Gaslight Company.

The death has occurred of Mr. Stephen Anderson, aged 83, a Director of the Hawick Gaslight Company, and one of the best-known public men in the town. He served on the Hawick Town Council for over forty years, as Councillor, Magistrate, and Police-Judge.

(For Forthcoming Engagements see p. 418.)

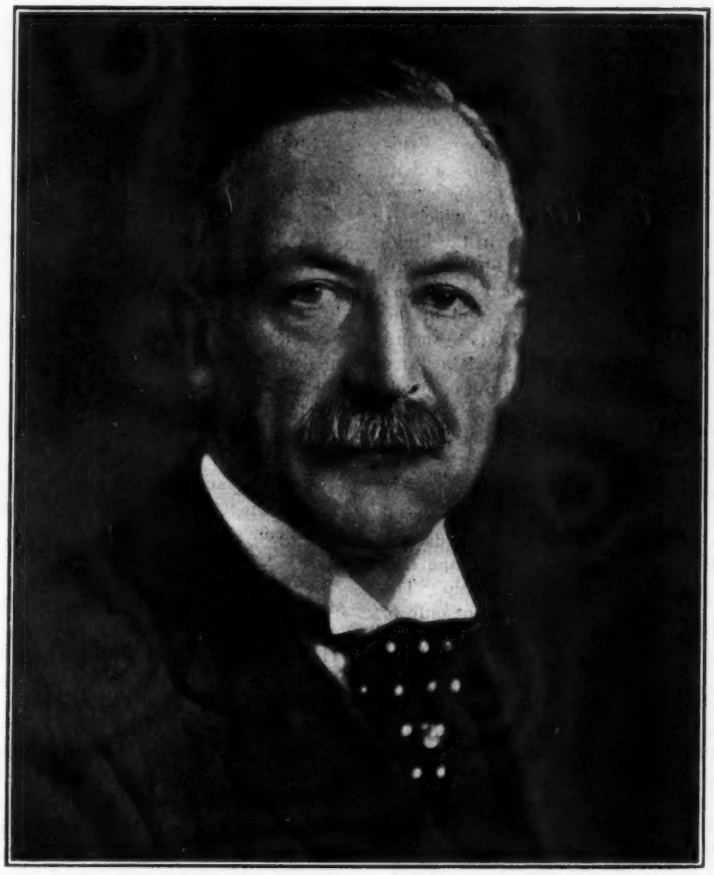
BRITISH COMMERCIAL GAS ASSOCIATION

Report of Proceedings

at the NINETEENTH ANNUAL GENERAL MEETING and CONFERENCE, held in Hull and Bridlington, Oct. 27, 28, 29, 1930

PRESIDENT - HENRY WOODALL, J.P., M.INST.C.E.

From the point of view alike of the business sessions, the social arrangements, the visits, and items peculiar to the occasion, the meeting is entitled to rank with the most successful of its predecessors. The attendance was large, and throughout there was an optimistic feeling engendered by a live organization representing a great industry.



HENRY WOODALL, J.P., M.Inst.C.E.,

Chairman of the British Gas Light Company.

Mr. Woodall may be said to have chosen his father well, for he is the son of the late Sir Corbet Woodall, who was the President of the Association's first Conference. Mr. Woodall is himself a leading Member of both the Institution of Civil Engineers and of the Institution of Gas Engineers. He has always been connected with the gas industry, and has visited the Dominions, the Continent, and other parts of the world on numerous occasions designing and supervising gas-works. He is the Chairman and Managing Director of the British Gas Light Company, Ltd., the undertaking which acted as host at the Hull Conference; Chairman and Managing Director of the Ipswich Gas Light Company; Deputy Governor of the Gas Light and Coke Company, London; Chairman of the Tottenham and District Gas Company; and a Director of several other gas undertakings.

PROCEEDINGS IN BRIEF

This is followed by the Presidential Address and Papers and Speeches at the Complimentary Luncheon to Sir Francis Goodenough and at the Dinner.

An Eventful Journey.

Even hotels have their limits, and the influx of visitors consequent upon the meeting was altogether beyond the accommodation available in Hull, and so the aid of Bridlington was sought in this respect. For those who proceeded earlier in the day to the latter place, the conference may be said to have started at about six o'clock on Monday evening, when they made their way to the Railway Station, to find a special train in waiting to take them to the reception at Hull. This journey was something of a novelty, for with the help of the Marconiphone Company, speeches and music were relayed to loudspeakers all along the train. The Mayor and Mayoress of Bridlington (Alderman and Mrs. H. Harker) were of the party; and short speeches were made while travelling by the Mayor and Mr. W. M. Mason, Manager of the B.C.G.A.

Bridlington's Welcome.

In the course of his remarks, the Mayor of Bridlington said: It is a great pleasure and distinct privilege to be allowed to give you, in a civic capacity, a most cordial welcome to Bridlington. In spite of the progress that has been made by electricity, gas still holds its own, not only for heating purposes, but more particularly as regards street lighting. In spite of Bridlington's electric lighting, I maintain that, for street lighting purposes, there is nothing to equal incandescent gas. The majority of the members of your Association are from large industrial areas, but our principal industry at Bridlington is giving health and happiness to our visitors, and in this we claim that we are very successful. We are now journeying to the industrial port of Kingston-upon-Hull, which is recognized as being one of the best shipping ports in the kingdom, and owing to its geographical position is one of the cheapest ports, especially as regards Continental goods. It has expanded considerably during the last few years, and at the present time the Municipality is making special efforts to secure new industries, and giving great encouragement and facilities to manufacturers and others to make their business headquarters at Hull.

The Salesmen of the Gas Industry.

Mr. Mason said: We are travelling towards the opening of the nineteenth annual conference of the British Commercial Gas Association, and we are also travelling towards the twentieth year of our existence as the Salesmen of the Gas Industry, for our true function is that of salesmanship. The Association is representing the whole gas industry not only of Great Britain but of Britain beyond the seas, since many gas undertakings overseas are members. The conference is always held in the town of the reigning President. This year, therefore, we assemble at Hull and Bridlington, as the centre of the gas undertakings in the Eastern Counties with which our President, Mr. Henry Woodall, is so closely associated. Following though he does a list of distinguished Presidents, Mr. Woodall does not stand merely in the reflected glory of these Past-Presidents—among them his father (the late Sir Corbet Woodall), Lord Moulton, Sir Robert Hadfield, and Sir David Milne-Watson. He himself is known throughout Great Britain and the Continent for his valuable work on behalf of our industry.

The history of the B.C.G.A. is not founded on words alone, but on concrete results. Our resources have been steadily applied to the public service for nearly two decades. We have looked forward eagerly to our visit to the East Coast. Hull is a gateway to the Continent, a door through which British manufacturers go out to meet world competition. What manufacturers need to-day in order to lower cost of production is cheap, clean and flexible fuel; we know that we can supply them with such a fuel. We have come here to offer them proofs, to show that we can help them to manufacture high quality goods at competitive prices, and thereby to increase business. Efficiency and economy are the proved results of the application of gas to industrial processes. That is why 3000 trades use it.

The result of this application travels far. The worker, steadily employed, has money to take home, and that money can be employed economically by the housewife using modern gas appliances. Again, these gas appliances, used in factory and home, make for a clean, bright sky, the clear air of seaside resorts like Bridlington. When all our industries use gas more fully we shall also have a clear atmosphere in our industrial cities, and even our most busy and prosperous manufacturing towns will become not merely wealth resorts, but health resorts.

"Smogs"—Coal Smoke Fogs.

In the impressive City Hall of Hull, the delegates were accorded a civic welcome by the Lord Mayor and Lady Mayoress (Councillor R. Richardson and Mrs. Richardson). Among those present were the Sheriff of Hull (Councillor F. Till) and Sheriff's Lady (Mrs. Till), the Mayor and Mayoress of Bridlington, and the Mayor and Mayoress of Beverley (Councillor and Mrs. Musgrave). Music (which included organ recitals by Mr. Frank H. Robinson), hospitality, and enjoyable social intercourse comprised part of a programme, which also included a lecture by Dr. C. W. Saleeby, F.R.S. (Edin.), Chairman of the Sunlight League, on the platform with whom, as Chairman of the evening, was Mr. Henry Woodall, who thanked the Lord Mayor for his kind reception.

Dr. Saleeby's enthusiasm in a good cause, his facts, and his lantern slides cannot fail to carry conviction, and we would that he could lecture in every building of the kingdom large enough to accommodate an audience. In England and Wales one person dies every twelve minutes from tuberculosis, even in these modern days. What an appalling indictment! And how incalculable is the help to the community which the gas industry is able to offer! For, declared Dr. Saleeby, until smoke and darkness are swept away such figures will not be improved upon.

A strong appeal was made to architects, who, the lecturer said, seem to be blind and deaf as far as the value of light and air is concerned. "Flats are being built in London for which £800 a year is asked. There is no means to ventilate the rooms. You are practically being asked to pay £800 a year to die of consumption. I do not think it is good enough." As an example of what can be done, he drew attention to the village of Thorpness, in Suffolk, where no less than 95 p.ct. of the houses are already provided with a supply of gas.

The Report and Accounts.

Assembling in the Grand Pavilion, Bridlington, on Tuesday, the Mayor was again in attendance to welcome the members, and he was thanked by the President on behalf of the Association, for permitting the conference the use of such a splendid meeting place. Mr. Woodall also announced the receipt of several letters of apology from those unable to be present—including one from Sir David Milne-Watson.

Sir Francis Goodenough (the Executive Chairman) presenting the annual report and accounts, pointed out that both income and membership showed a steady increase, and this provided the best practical proof that the necessity for the Association and its value to the subscribers continued to be recognized in growing measure. "We have," he went on, "never looked back, in membership or in income, since the Association was launched just nineteen years ago." The "JOURNAL" does not take to itself his remark that, "while newspaper comment

is of great value, newspaper dictation of policy is, in my opinion, no more good for an industry than for a nation."

The membership represents 96 p.ct. of the total make of gas in Great Britain; and the Association now has, without exception, the name of every important undertaking on its membership roll, to which have been added during the year a further 23 smaller undertakings. The campaign for voluntary additional subscriptions has been continued, and the results justify the belief that it will be possible in the next report to record a further substantial increase in income to enable the Association to increase its expenditure on national and district propaganda. The report tells a gratifying story of increasing use by members of the various services that the Association can render them. There has been a large increase in publicity material sold—an increase of no less than 350 p.ct. in ten years.

"Undertakings must," Sir Francis concluded, "themselves win the satisfaction and good will of their customers. Let me once again beg every gas manager in the country to put himself into line with those of his colleagues who, through a constant supply of good gas at good pressure, through a system of maintenance of fittings and appliances, and through unfailing courtesy and promptitude of attention to their customers' needs and wishes, have built up a wall of goodwill around their business which competition will find it hard to surmount. The friendship of the customer is the very bed-rock of business prosperity, and it can only be cultivated by the local undertaking, not by any national organization."

THE MAYOR OF BRIDLINGTON BROADCASTS ON THE TRAIN.

The adoption of the report and accounts was seconded by Mr. W. J. Sandeman, with the remark that every farthing subscribed to the Association was spent to the very best possible advantage. Mr. A. W. Smith supported the motion—emphasizing the necessity, driven home by Sir Francis, for cultivating the good will of the consumers in the districts of the individual undertakings. The Association could not help the members unless the members helped themselves. He added that the Birmingham Corporation Gas Committee had decided to increase their subscription to the 7s. 6d. per million rate, which was an indication of their appreciation of the value of the work of the Association.

The report and accounts were adopted unanimously.

Progress of the Industry.

Messrs. S. E. Halliwell and W. N. Westlake having been appointed scrutineers, the President rose to deliver his address. This he began by quoting some highly encouraging figures, showing that, in spite of the fact that the consumer now gets about ten times the value from the gas he uses for lighting purposes, and double the value from gas used for cooking and heating, that he did forty years ago, the undertaking to which the figures related is selling twelve times as much gas as in the earlier period. This undertaking is a Company which Mr. Woodall has known well for the period named, and with which he has been very closely connected for the last twenty years. The figures quoted were as follows:

In 1890 the gas sold by the undertaking was 300 million c.ft.; to-day it is 3600 millions, or twelve times as much. The capital per million sold was £595; to-day it is £462. The price of gas is higher by only 14 p.ct., though the price of the raw material, coal, is 54 p.ct. higher, and the cost of living is up by about 75 p.ct. Owing to the introduction of the Welsbach burner in 1893, the consumer now gets ten times the light he did formerly from the same consumption of gas. It was not till 1893 that the Company started prepayment installations and provided a boiling ring and four lighting points. At the end of that year there were 68 consumers; now in the Company's area there are 72,000 prepayment installations. The modern gas fire has been greatly improved, and probably in 1930 the gas fire and gas cooker are twice as efficient as in 1890.

"The story of the industry," said Mr. Woodall, "is one of constant progress, which I am sure could not have been attained if Boards of Directors were incompetent and failed to uphold their officials. I am confident that in the vast majority of cases Directors encourage and stimulate, rather than discourage and thwart them."

Proposing a hearty vote of thanks to the President for his address, Sir George Davies remarked that it was in the last twenty years that the industry had had its largest development, and it was during this period that they had had the competition of electricity. A great deal of this development and success had been due to the work of the B.C.G.A.; but excellent as this work had been, it might have been even more useful had they been in a position to devote a larger amount of money to it. The vote was accorded with applause, after it had been seconded by Mr. Frank West, Chairman of the Society of British Gas Industries. Responding, Mr. Woodall declared that he had enjoyed his year of office, and that the more one knew about the Association the better one appreciated the useful work done by it.

" Flues Abolish 'Flu."

This was suggested as a slogan by Dr. Elizabeth C. Mudie, who is, as the President declared, an enthusiastic advocate of gas. Her views on gas in relation to hygiene, as enunciated in a paper which she read, are worthy of the widest possible publicity, and we should like to see them brought to the notice of those people—those astonishingly numerous people—who are even yet ignorant about facts which so much trouble has been taken to explain. Definite laws regarding the sale of food have existed since 1875; but the Statute, in defining food, has left air, which is the most important food of all, to take care of itself. The air we breathe, said Dr. Mudie, is about ten times as much in weight as the food we take; food is only taken at intervals, while air is breathed throughout the twenty-four hours, sleeping or awake. She pointed to the need for adequate ventilation with the use of electricity or radiators. " You do not," she said, " get currents of air with the so-called radiators that we see in our schools." Dealing with the objections raised to gas fires, she said one of these—that gas uses up a considerable amount of oxygen—is not an objection, since the gas fire uses up the oxygen of the air which goes up the chimney, and not of the air which is continually being drawn into the room to replace it.

American Testimony in Favour of the Gas Fire.

While reading her paper, Dr. Mudie added: We have been hearing a great deal lately about infra-red rays, but you do not want me to tell you the physics of that. Every schoolboy knows about the visible and invisible spectrum, and about the infra-red or ultra-violet rays. It has been known for some time that there is a certain field for the burning of gas in that it has been discovered that a gas fire emits infra-red rays; but that matter has received further investigation, and since I wrote this paper there has appeared the result of researches made in America on the subject. In the October issue of the " British Journal of Actinotherapy," Dr. Coblentz gives the result of researches which indicate that from the gas fire an appreciable amount of ultra-violet rays are obtained. I think this is a most important discovery. At a meeting in Ayr recently, I said I hoped the time is not far distant when, with the ordinary heating apparatus in our homes, we shall be able to switch on ultra-violet rays, and it seems that that time has almost arrived already. Anybody who may have had doubts as to the value of gas fires, must surely have those doubts removed now. The report of this latest work merely says it was an ordinary gas fire that was used, and that the same results could not be obtained with electric lamps.

Proposing a vote of thanks to Dr. Mudie, Mr. C. S. Shapley congratulated the Executive on their happy thought in inviting a lady to give her views on the uses of gas and its effect upon the health of the community. Alluding to the paper, he agreed that a flue is absolutely necessary in every room and office. Mr. H. M. Thornton, seconding the vote, said there is so much in the gas fire to recommend it above all other fuels, that it is up to the industry to stress to the utmost these advantages. In ventilation the industry possesses a powerful weapon, of which use should be made in attack, and not merely in defence. Sir Francis Goodenough also expressed the view that too much cannot be done to make known to the public that the medical profession as a whole are great believers in the hygienic value of the gas fire. He was able to tell the meeting that it is more than ever true to-day that the highest output of gas per acre of any residential district in London is in the Harley Street area, which is so largely occupied by doctors.

What Smoke Does.

In Glasgow Dr. Mudie made experiments to see how much ultra-violet penetration of the atmosphere there was with brilliant sunshine on a March day, when the observatory recorded nearly 11 hours of brilliant sunshine. She had an instrument on the fifth floor of a house, not in the slum area of Glasgow, and the observations were taken on a day when the sky was bluer than she has ever seen it before or since, and yet the reading was only 1·5, as against the 16 which she would have got with the same amount of sunshine " if it had not been for the man-made pall of smoke which intervened between the sky and the recording instrument." This means that on ordinary days Glasgow gets no ultra-violet light at all.

" Clean the Skies."

Referring to another slogan, Dr. Mudie pointed to Dr. Saleeby's remark on the previous evening that once in twelve minutes somebody dies in this country from tuberculosis. " They are the dead ones," she went on, " who are no longer a tax on the State, but what about the living ones? About 10 p.ct. of the population suffers from tuberculosis in some form or other, and most of these are chargeable to the State. That is one of the diseases of darkness, and, as Dr. Saleeby said, it ought to be abolished like leprosy."

Exeter Next Year.

At this point, the President announced the report of the Scrutineers, that Mr. John E. Daw, J.P., Chairman of the Exeter Gas Light and Coke Company, had been unanimously elected President, and that the Auditors were Messrs. Cash, Stone, & Co. Acknowledging his election, Mr. Daw said he hoped that next year the meeting would take place in Exeter. Perhaps it might be possible to arrange for it to take place a little earlier in the year, as just at this time the municipal elections occupy so much attention.

The First Gold Medallist.

A hearty reception was accorded Mr. P. Pickering, Sales Superintendent of the Rochester, Chatham, and Gillingham Gas Company, when he stepped up on to the platform to take the first gold medal presented by Sir Francis Goodenough for a paper which had been judged by himself and the Vice-Chairmen of the Association to be the best that was submitted for consideration. It was explained by Sir Francis, in presenting the medal, that it was for the best paper on the commercial side of gas salesmanship, as distinct from the technical side. The Society of British Gas Industries are presenting a medal for the best paper on the technical side.

After returning thanks for the medal, Mr. Pickering said: The position in which I find myself is a rather humorous one, for Sir Francis Goodenough will remember that, when the idea of the presentation of medals was first mooted, I opposed it. I then said: " We have no desire for medals; " and here am I the first recipient. [Laughter.] You will, therefore, believe that I am very sincere when I tell you I appreciate the distinction conferred upon me, both because it will remind me of my happy year of office and because the donor is one held in the highest esteem, not only within our industry, but by everyone who knows him. His fame is world-wide and has been recognized by His Majesty the King. I hope Sir Francis may be spared for many years to guide us in the principles of which he is a master, and may the Gas Salesmen's Circles go on from strength to strength, thus advancing the service which the gas industry is able to provide to the community.

Executive Committee and Officers.

Proposing a very hearty vote of thanks to the Executive Committee and officers and staff of the Association for their work during the past year, Alderman F. J. West said that the annual conference was but one item in connection with the wide activities and many ramifications of the British Commercial Gas Association. Behind this conference, successful as it was, a tremendous amount of work was put in by the Executive Committee and the officers which very few people really appreciated. In all successful organizations it was the unseen work that counted for so much—that regular attendance of the members of the Executive Committee, their assistance in difficult deliberations, and the steady and solid work of the officers.

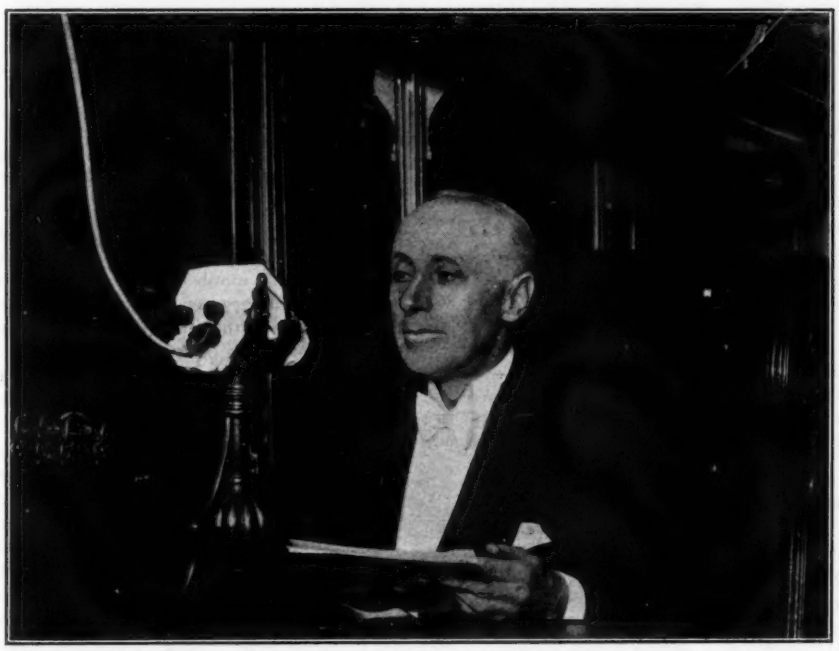
Sir Francis, acknowledging the vote, which was carried with applause, without the formality of being seconded, remarked that it was very gratifying to the Executive Committee and the officers to have Alderman West proposing this vote of thanks (with Mr. Henry Woodall in the chair), when they remembered that his fine old father, Mr. John West, was present at the Manchester conference—their first annual conference—when Sir Corbet Woodall, their President's father, was in the chair. Mr. John West was one of the earliest and most staunch supporters of the Association, and so had his son Fred been from

its very earliest days. The proposer of the vote was on the first General Committee, and had always taken a close interest in the Association's work. In the officers the Association had a wonderful team who rendered unremitting and most zealous service, without which the Executive could do but little.

A Well-Deserved Compliment.

Between the morning and afternoon sessions on the Tuesday, there was a delightful function, which took the form of a complimentary luncheon to Sir Francis Goodenough, by the President, Vice-Presidents, and members of the Association. There must have been about 300 persons assembled to do honour to an old and valued friend, and the occasion was one which will long be remembered by everyone—including Sir Francis. The letters read and the remarks of the President and Alderman F. S. Phillips obviously expressed the sentiments of all who heard them; and it is a pleasure to know that these sentiments were accompanied by gifts which will serve as constant reminders to Sir Francis and Lady Goodenough of the affectionate regard in which they are held throughout the gas industry, and of the satisfaction felt that he has had conferred upon him the honour of Knighthood. As the President said: Sir Francis has spent all his life in the gas industry, and although we, his friends, know his worth, at the same time we recognize that he has done something—in fact, a very great deal—for the development and encouragement of salesmanship outside our own particular industry. Sir Francis is never idle, and the time he might have spent in well-earned leisure he has largely devoted to public work. Knighthoods are not bestowed, and rightly so, for simply doing one's own work, but are given for important services to the community. Sir Francis' qualities have been observed, or he would never have been appointed Chairman of the Committee on Salesmanship set up by Lord Eustace Percy; and it is largely for his special work that our friend has been so highly honoured.

Sir David Milne-Watson wrote that he regretted business kept him in London, and that he would like, though absent, to join with Sir Francis' many friends in conveying to him their good wishes, and their hope that he would long be spared to enjoy this honour.



MR. W. M. MASON SPEAKS OF AN ASSOCIATION WHICH REPRESENTS THE WHOLE GAS INDUSTRY.

Sir Francis' Thanks.

Responding to the toast of his health, and thanking those present for the gifts, Sir Francis characteristically said he hoped that none of his friends would find him any different now from the Frank Goodenough they had always known. He expressed his gratitude to Sir David Milne-Watson and the other Directors of the Gas Light and Coke Company, for their broad-minded generosity in permitting him to perform the public services which had brought him his honour, and also his gratitude to the Association for having given him its confidence and support for nineteen years. The great kindness that he had received from his friends had filled him with happiness.

He concluded by quoting from Belloc a verse the final lines of which read:

> "There's nothing worth the wear of winning,
> But laughter—and the love of friends."

To those subscribers who were not able to be present Sir Francis addresses the following letter:

> DEAR SIR,—May I ask the hospitality of your columns whereby to convey to the many subscribers to the presentations made to me on Tuesday last who were not able to be at the luncheon my very warm thanks and those of my wife for the charming gifts (and the very handsome cheque accompanying them) to which they so kindly contributed?
>
> I value very highly the many expressions of friendship and goodwill which have reached me in connection with this presentation and the occasion of it. It has greatly enhanced the pleasure and happiness created by the honour conferred upon me to know that it has been "endorsed" by the industry which it is my joy to serve, and in which I am proud to have so many firm friends. To them, one and all, I send my warm regards and thanks.
>
> Yours faithfully,
> FRANCIS GOODENOUGH.
>
> *Gas Light and Coke Company,*
> *Horseferry Road,*
> *Westminster, S.W. 1,*
> *Oct. 30, 1930.*

The Ever-Present Need.

The afternoon was devoted to consideration of two papers—the first by Mr. Harold E. Copp, who, in addition to being Engineer of the Hull Works of the British Gas Light Company, is President of the Institution of Gas Engineers. The subject dealt with was service to the consumer, or, as the author would have preferred to describe his paper, "Duties and Obligations to the Consumer." As the greatest service he put the supplying of cheap gas, so that service originates in the retort house. The gas must, of course, be constant in composition, calorific value, and pressure. "During the past ten

years," said Mr. Copp, " conditions of life and the outlook on life of the people of this country have undergone a fundamental change. Bureaucracy has developed to an alarming degree, and people have begun to look to some authority—whether governmental or municipal—for all the requirements of life. This has given rise to the creation of armies of inspectors and officials. Gas undertakings should, therefore, strive to render service to their consumers in the most quiet and unobtrusive manner. If a consumer wishes to purchase any gas apparatus, the number of forms to be signed and the number of workmen or inspectors who call at his house in connection with the transaction should be reduced to a minimum. It must be remembered that the psychology of the public varies in different parts of the country, and that services such as we may render will be welcomed in some districts and resented in others."

In Hull, Mr. Copp's Company have had an organized system of maintenance in existence since 1910, and the men are instructed to render every possible service to the consumer in as unobtrusive a manner as possible, and to be courteous on all occasions, first consulting the consumer to obtain his consent to enter the premises. Apart from this organized scheme, and that of the maintenance of burners (on which women only are employed), every workman in the Distribution Department has now become, to a large extent, a maintenance man, inasmuch as a request from a consumer to call and repair (say) a cooker tap, does not often end in his card being marked " tap repaired," as he is instructed to make a courteous inquiry for permission to examine and adjust, if necessary, any other gas apparatus on the premises. A list of such appliances is now being made, so that in due time it is hoped to compile a complete inventory. Those which are found unsuitable are in most cases replaced. In this manner, water-slide pendants have been eliminated, and very few cork slide pendants remain in the district.

It is Mr. Copp's firm belief that, for efficient service, every gas consuming appliance, of whatever character, should be periodically examined, so that it may be kept in the highest state of efficiency. At the same time, he is not unmindful of the question of expense; for he expresses some alarm at the " ever mounting costs of the distribution of gas in relation to those of manufacture. Some limit must ultimately be set, or we may defeat our own objects, the chief of which must be cheap gas."

The Industrial Load.

Speaking from his unique experience as Manager of the Special Service Section of the Gas Light and Coke Company, Mr. H. H. Creasey (who also read a paper at the first conference of the Association in 1912) illustrated the very prominent part that gas plays in the manufacture of all the various things needed in our complex civilization, including the preparation of various foods and other necessities of life. The Section of which he is Manager has now twenty representatives and assistant representatives, who deal solely with factories or workshops—who, in other words, are industrial salesmen. Reference was made by the author to the early days of the Company's Industrial Demonstration Workshops and Showrooms in Goswell Road, and to the valuable help on the experimental side of industrial work rendered by Mr. B. W. Brooks, who was in charge of these premises until a few years ago. It may be recalled that Mr. Brooks read a paper at the conference of the Association at Sheffield in 1920.

Outstanding Instances.

At the present time, the printing firms alone in what is known as the square mile of the actual City of London consume about 300 million c.ft. of gas per annum—85 p.ct. of which is for industrial purposes. One well-known firm of gold refiners in 1929 used about 24 million c.ft., of which 22¼ millions were for industrial purposes. The total number of factories and workshops on the Company's record cards, with the consumers' names and addresses on each, is nearly 17,000. The number of actual industries and their branches in which these firms are engaged is no less than 1150, each absolutely different from the other, though it may be a branch of the same major industry.

The Company have recently extended to central heating by gas the same scale of discount as is granted for manufacturing purposes. As a result of this concession the load is now continually growing, and, while the figures are yet comparatively small, there are now no less than 85 consumers who are centrally heating their premises or residences by gas-fired boilers. Of these 85, there are ten cases in which the Company have installed gas-fired boilers for centrally heating factory premises. As an indication of the value of this new load, Mr. Creasey mentioned that in 1929 the average consumption per installation for central heating purposes was nearly half-a-million cubic feet per annum.

The Company have now 183 fried fish shops in their area of supply using gas-fired furnaces. The total consumption of these 183 shops for the past twelve months was 72 million c.ft., or an average of nearly 400,000 c.ft. per annum per installation. The business is constantly increasing—indeed, one of the representatives has just obtained orders to install gas-fired furnaces for six additional fish-fryers on the area upon which he is engaged.

Importance of the Industrial Load.

During 1929 the Company's industrial representatives obtained orders for the following additional appliances:

Cookers	745
Water heaters	240
Fires and heaters	3,481
Lighting burners	2,944
Industrial appliances	3,147
The money taken for the sale and installation of appliances was	£38,543
The estimated additional annual consumption of the appliances installed was no less than	1¼ million therms, or 250 million c.ft.

It may be noted that only 666 industrial appliances were installed in 1921, as compared with 3147 last year, and that the total additional number in the past nine years is over 16,000, or an average of 1777 per annum. During the present year there has been still further advance; and these successful results have been achieved in a period of very bad trade.

The General Electric Company are the Company's second largest industrial consumer (with an annual consumption of over 90 million c.ft.), and this firm are now extending their works at Wembley, for which the Company have run a new 12-in. main into the factory, and have already installed a 9000 c.ft. per hour high-capacity meter. The Company have recently put in an additional 6-in. service for a well-known international firm who are engaged in the metal industry, and who now have a gas installation with a capacity of 16,000 c.ft. per hour in their factory. The Company made them three specially constructed double-deck furnaces, and have just received a letter from them stating that these furnaces are considerably more efficient than any of similar type which they have previously used.

Some Big Figures.

The Gas Light and Coke Company give a discount for gas used for industrial purposes, and this starts at 12½ p.ct. off 350 therms in a quarter, and rises by gradations to 20 p.ct. To enjoy this discount, the industrial consumption must be separately metered, or in rare cases a certified " manufacturing purposes " percentage is agreed of the gas which is consumed through a meter which includes gas consumed for other purposes. In 1929 the Company had 3167 consumers who thus consumed more than 350 therms per quarter, and these firms consumed no less than 2637 million c.ft. for industrial purposes alone. They also consumed 350 millions for general purposes and about 130 millions for power, so that the total gas consumption of the 3167 consumers was 3117 millions, or nearly one million per annum each. The gas engine consumption is quite a substantial item. There are 2000 engines in the Company's area, and their consumption for 1929 was 384 millions. Indeed, they have recently installed a number of new gas engines—one in place of electric motors.

Mr. Creasey calculates that in the remaining factories and workshops, using gas for manufacturing purposes which is not separately metered, 1270 million c.ft. is consumed for industrial purposes, 140 millions for general purposes, and 123 millions

for power, or a total of 1533 millions, which, added to the definitely ascertained figure of 3117 millions, makes a grand total of 4650 millions, made up of 3907 millions industrial, 490 millions for general purposes, and 253 millions for power.

Look After the Coke.

Mr. Copp's and Mr. Creasey's papers were discussed together, Mr. Ralph Halkett rising first, and expressing the view that service, instead of beginning in the retort house, extends from the purchase of the coal until the resulting gas is consumed. He drew attention to the big market which the industry have for coke for domestic purposes, provided that it is properly graded and properly cleaned. The competition with which the industry is faced, however, makes it absolutely essential that the best possible should be done in this matter. "There is," declared Mr. Halkett, "an outlet for practically all the coke produced by gas undertakings, if we see that it is properly prepared to suit the consumers."

And Encourage the Industrial Consumer.

The need was emphasized by Mr. Halkett of encouraging the industrial user with terms attractive enough to induce him to consume gas for all purposes. A demonstration room, with facilities for designing furnaces to meet particular requirements is the only way in which business can be secured. In spite of bad trade the Sheffield Gas Company are well maintaining their last year's load. In order to encourage the large consumer, Mr. Halkett recommended his Board to sell gas on contract for twelve months at 1s. per 1000 c.ft., with a stipulation for a percentage increase. If industrial loads are desired, "it pays to specialize." Mr. Halkett holds very strongly the view that, in order to foster the industrial load of the town gas industry to the utmost limit, full liberty as to the method of charging is essential.

A Conference Suggested on the Industrial Problem.

A good point was made by Mr. H. C. Smith, who suggested that, in view of the great value of the conference on maintenance which was held some time ago, it might be helpful if there could be arranged in the near future a conference on the industrial problem. In Tottenham the necessity has been realized of starting an Industrial Section, and experience has proved that it is essential to arrange for calls upon industrial firms. His Company have been astounded at the number of processes in which gas can be used, and manufacturers are willing to listen to a man who understands the matter. It will not be long, Mr. Smith thinks, before the Industrial Section at Tottenham has to be very much enlarged.

Importance of Uniform Supply.

Dr. C. M. Walter said that, with modern apparatus, we have reached a point now when the limit of control does not depend on the controlling apparatus, but on the variation in the gas supply. He is always out himself for a uniform supply of gas. He would rather have a slightly lower calorific value than a gas which varies from time to time within wide limits.

SOMEWHERE BETWEEN HULL AND BRIDLINGTON.

British Gas Light Company's Hospitality.

On the Tuesday evening in the dignified banquetting hall of the historic Guildhall at Hull, the President-Elect, Vice-Presidents, and members of the Association and visitors were the guests at dinner of the Chairman and Directors of the British Gas Light Company—the President occupying the chair, and expressing his delight at having this opportunity of returning the hospitality which had been extended to them on the previous evening by the Lord Mayor, and to welcome in that noble hall, which had been kindly lent to them for the occasion, so many prominent citizens. He extended the good wishes of the Association to their friends from across the Channel—the representatives of the gas industry of France, MM. P. Mougin,

E. S. Saint-Just, and A. Sellié. The guests on their arrival were received by Mr. Woodall, who was supported by Mr. Harold G. Palmer (Deputy-Chairman of the Company) and Mr. A. W. Brookes (Director). Mr. J. F. Ronca (Director of Gas Administration, Board of Trade) submitted the toast of "The Gas Industry," which was responded to by Mr. A. Procter (Chairman of the York Gas Company). The Sheriff (Councillor Till) said he was given to understand that the City Council Chamber was built on the site of Hull's original gas-works. The musical programme under the direction of Mr. F. W. Barker was a feature of an altogether enjoyable evening.

At University College, Hull.

The conference was resumed, and concluded, on Wednesday morning in the perfectly equipped Assembly Hall of University College, Hull, where Prof. Conrad Gill, in the absence of Principal A. E. Morgan, M.A., welcomed the members. He said that they had in the college a pleasant association with the members of the conference. A day or two ago Sir Francis Goodenough kindly gave them an address which would prove to be of material value in the development of their work in training for industrial administration, and Mr. Copp was a member of their Commercial Advisory Committee.

The indebtedness of the Association to Principal Morgan for the use of the hall, and to Prof. Gill for his welcome, was voiced by the President, who said they were all aware of the fine work being done by the College in the development of education for industry and commerce. Personally, he was glad to think that the British Gas Light Company were working to some extent in co-operation with the College.

Education for Industry and Commerce.

A paper prepared by Principal Morgan was then read by Prof. G. C. Allen. In this the author expressed his belief that the solution of the vital problem of education for the higher walks of business is going to be solved on much the same lines as it has been, with undoubted success, for the other professions. In other words, we must have a course of training which combines the theoretical and the practical. The great difficulty is to decide what this practical training is to consist of. It is quite clear that no university course of training can qualify young men to run a business or even to step at once into a position of high responsibility; but the author believes a good deal more can be done than is yet done in university commerce courses to give a measure of practical training. In the first place, it will be necessary to classify and divide businesses.

If the universities are going to give a qualification for business executives, they must collaborate with business, and make arrangements by which students can go into works and offices to see the every-day working of industrial and commercial concerns. This is by no means impracticable, and firms are very willing to assist. Mere sightseeing is not likely to be of lasting value. Arrangements should be made for students to go into firms as employees. It is not likely that they will be paid; nor can they expect it. Employment of this kind for a vacation, or better still for longer periods, is what is really necessary. Before long he hopes to see a system of training in which employment in firms is as integral a part as the shop training for engineers. Several large firms have agreed to co-operate with the College on these lines, and students taking the course in Industrial Administration will have the chance of being sent by the department for practical demonstration of business methods and procedure. The British Gas Light Company is one that has consented to help in this way.

The Sales and Service Side.

A sound practical scheme for the education and training of those engaged upon the Sales and Service side of the gas industry is being asked for in all directions, not only by managers who appreciate the pressing need, but—and especially—by the salesmen themselves. This was stated by Sir Francis Goodenough in his paper; and, on the other side, he pointed out that suitable recruits, suitably educated in the science and trained in the art of commerce as applied to the gas industry, must be adequately paid and given inviting prospects of promotion, if the right types of recruits are to be attracted to, and retained in, the industry, as it is imperative that they should be, if the industry is to maintain itself and to make progress in the teeth of the competition of to-day and, still more, of to-morrow.

A serious warning was uttered by Sir Francis to those managers and administrators of gas undertakings who are not yet fully convinced of the vital importance of skilled personnel to the future of the industry. His words were: "I want to say to them, with all the earnestness of which I am capable, that the progress—I would go so far as to say the existence—of the gas industry during the next twenty years depends largely upon our realizing to-day the imperative need of modern methods and modern men for the conduct of our undertakings as commercial organizations. Unless we employ the best weapons, we shall perish in the fight that lies before us—is, indeed, already upon us. Competition can only be countered by efficiency, and you cannot be efficient unless your staff is efficient. It has been well said that those who do not value trained intelligence are doomed. This is true alike of the nation, faced with keener and keener foreign competition, and of the gas industry, faced with Government-fostered competition that daily grows in intensity."

The Education Scheme of the Institution of Gas Engineers, on its Gas Supply side, forms an essential part of a complete scheme for the education of the commercial staff; and the Executive, realizing that the time has now arrived for providing the supplement to the Institution scheme which will meet the needs of the salesman, last July appointed a Special Committee to consider the question. As the result of that Committee's report, there is being recommended to the General Committee a scheme which, in addition to being placed before the conference, it is intended shortly to put before a meeting of representatives of the Salesmen's Circles and of teachers in gas supply, so as to have the benefit of their experience and advice.

The problem of commercial education for the gas industry—that is, education for Gas Salesmanship in its broadest as well as more narrow aspect—is a three-fold one, embracing: (A) General education—for the development of the student's intelligence and for ensuring activity of thought, receptivity to ideas, and the capacity to speak and write correctly and acceptably. (B) Knowledge of the particular business and of the commodity to be sold, including: (*a*) A sound elementary knowledge of the manufacture and distribution of gas; (*b*) a more advanced knowledge of the utilization of gas; (*c*) a broad knowledge of the history of the industry; and (*d*) an understanding of the relation of the industry to national problems. (C) Training in the science and art of selling—to enable the student to become expert in securing and maintaining the goodwill of the customer.

General Education.

Employers who take a broad and long view of the value to their undertaking of the continued intellectual development of their adult staff, use all the practicable means they can, without appearing either to dictate to individuals or to interfere with their personal inclinations, to encourage studies or social activities that make for such development. Classes or lectures in English Literature, Economics, History, and the Arts, as well as most of the Sciences (general, as well as those of specific application to the industry), are obtainable in every area up to quite a high standard, and instruction in Elocution is also available in many districts. Facilities afforded for attending approved classes or lectures, assistance given in suitable cases in the payment of fees, and interest shown in the progress made by students, are always greatly appreciated by the staff, and lead to a marked increase in their value to their employers and the establishment of a higher *esprit de corps*. The ready and willing co-operation of the Local Education Authority can be relied upon in all matters concerning the general education of employees. Frequent contact between employers and the Local Education Authorities—such as already exists in some districts, but not by any means in all—is very desirable, as tending to ensure that education is planned and conducted with a view to combining practical utility with cultural value.

Knowledge of the Business.

Assuming that there is a candidate of suitable character and personality, whose intelligence has been developed and his

mind furnished through a sound general education, or who is being helped and guided in the right way to make good the deficiencies of his early education, the next important step towards making him a first-class gas salesman is to see that he understands sufficient of the commodity and service he has to sell, and of the business in which he is engaged, to enable him to talk interestingly, but not too technically, to consumers; to answer any questions that may be put to him; and to state the case for gas for any purpose accurately. This side of the salesman's education divides itself into: (1) Acquiring the necessary degree of technical knowledge; and (2) acquiring the necessary amount of knowledge of the industry as a public utility.

Training in the Science and Art of Selling.

An employee completely equipped with scientific knowledge and technical skill, with general information respecting the history and policy of the industry, and with accurate statistics as to the relative costs of gas and electricity, is, however, useless as a salesman unless he knows how to use those tools on the job—the job of pleasing and persuading the customer. Accordingly a scheme has been drawn up for conducting a training course in the Art of Selling Gas (Domestic).

Sir Francis concluded by expressing the hope that the Executive will soon be authorized to take all necessary steps to put into working order a scheme for the Education of Salesmen on the lines laid down generally in this paper.

MR. P. PICKERING, OF ROCHESTER, RECEIVING FROM SIR FRANCIS GOODENOUGH THE "GOODENOUGH GOLD MEDAL" FOR THE BEST PAPER ON SALESMANSHIP BY A MEMBER OF A SALESMEN'S CIRCLE.

Staff Training of the Gas Salesman.

The subject of education of the gas salesman was also dealt with by Mr. Harold Whitehead, Member of the Faculty of Boston University, and head of the Department of Sales Relations Vocational Training Department. Mr. Whitehead, who was born in Birmingham (England), possesses an extensive knowledge of the gas industry. He is Business Consultant to the Boston Consolidated Gas Company, and assisted in the development of the American Gas Association's Sales Course.

Speaking of the benefits of training, the author said that, if education is to be effective, the salesman must be fully receptive to it; and what makes a man eager to benefit by training is the benefit to him which comes from it. It is generally agreed that most men work for three definite things, and in the following order: First, a permanent position with a regular and certain income. Secondly, working conditions which satisfy his ego. Thirdly, opportunity for increased income. Gas undertakings generally give the salesman this first and major requirement. Yet a sure position does not of itself develop initiative, nor encourage hard work. The other two requirements are doubtless supplied by most undertakings. The salesman can be stimulated to do his best if ne is treated with consideration, encouraged to work consistently, and to think and act creatively. The man whose sense of personal pride and well-being is appealed to, and who does not suffer the snubs and the unreasonable control which develop an inferiority complex, can be counted on to get results which driving cannot begin to obtain. If to this is added the third thing—opportunity for increased income—every salesman worth his salt will give the best he has in him.

Mr. Whitehead then outlined the B.C.G.A. training course in Domestic Gas Salesmanship. All who successfully complete the course are to be awarded a special B.C.G.A. certificate.

Programme of Sales Course.

In the course of explaining the programme of sales course, Mr. Whitehead said: In building up the sales training course, we first gather all the facts we can relating to what is being said and done in the selling of gas appliances. We gather this information in several ways. Carefully instructed men and women visit showrooms as shoppers. They note accurately what the salesman says and does, particularly observing the good things. I would like to emphasize that we are interested in hunting for sound, practical sales methods, and have little concern with the indifferent or ineffective. These shopping experiences are conducted by a number of people of varying age and temperament, so as to ensure a fair and complete picture of gas selling as it is actually conducted. In addition to this, the heads of selected gas undertakings are interviewed and the benefit of their ideas secured. Further, when an unusually clever salesman is discovered he is interviewed and observed, if permitted, so that the benefit of his skill can be had for all the men who help to make up the army of gas salesmen. Makers of all kinds of gas appliances are interviewed for their ideas and practical suggestions. Gas consumers are talked with, so that the viewpoint of the customer is secured.

All this mass of splendid material is then carefully consolidated and classified, and definite conclusions made. Sales ideas are compared with other sales ideas, and properly evaluated. And the work cannot be done by amateurs, for it requires a background of selling experience and sales judgment, as well as trained, educated minds, to get the most value for this material. When the work is done, a definite outline is made of the course. And then a most important step is taken. The detailed recommendations are submitted for consideration, criticism, and—finally—approval, to the Committee of gas sales executives appointed by the B.C.G.A. for this purpose.

This sales training course is to be the B.C.G.A. course in domestic gas salesmanship. Every word contained in it, every

suggestion made, is scrutinized and approved by the Special Committee appointed for this purpose.

Method of Training.

The plans and procedure for selling domestic gas appliances are printed in a series of six Units. These Units are posted

Before the Morning Session at Bridlington.

one a month to every subscriber, who then has opportunity to study them. At the end of each Unit is a Sales Case. This Sales Case is really a complete selling experience. Some parts of the Sales Case are good, some poor. The subscriber analyzes the Sales Case in the light of what he has studied in the Unit, he applies the newly acquired information and the freshly presented facts with which he may have been familiar, to that particular Sales Case. He has to do some original and constructive thinking.

Most salesmen dislike having much writing to do—and gas salesmen are no different from others in this matter. Instead of requiring long written answers, we supply a number of answers to each question asked, so that the salesman has merely to put a cross on the answer he believes correct. These answers are so planned that a careful study of the Unit is necessary for a correct answer. Thus we ensure the maximum of constructive thinking for the minimum of writing. The subscriber posts his marked papers to our offices, where they are graded. If the subscriber adds comments or asks questions, he receives a letter from the Service Manager for the B.C.G.A. course. In addition, he gets an analysis of the Sales Case, which enables him to clear up in his mind any possible mistakes in answering that he has made.

The next step is a series of meetings of the men. We are not strong believers in so-called lectures. We urge every gas undertaking to appoint a group leader who will lead the meetings of its own salesmen. To aid the group leader, we provide carefully outlined programmes, so that all the leader has to do to ensure a successful meeting is to follow the suggestions. Instead of the leader giving information, he asks questions and encourages discussion.

When the salesmen are accustomed to hearing themselves speak, and the quite natural diffidence at speaking before several other gas men has worn off, another step is made in the development of a practical selling technique. The group leader calls for demonstrations of the selling methods—so the salesmen then learn to do what they have read about.

A further step is made when salesmen are asked to try out in the showroom or at the home certain of the sales methods they first read, then discussed, and then demonstrated. As the men are asked to report at a later meeting the success they had in this, the selling procedure is carried into actual use in getting business. Better selling technique thus becomes a matter of habit through operation.

This combination of printed Units, Sales Cases, and meetings makes it possible to carry specialization to a fine point. The group leader is supplied with the necessary material to enable him to specialize on any particular gas appliance in which his undertaking is interested at that time. Further, the meeting manual is so flexibly planned that a group of thirty or more, or only two or three, may have successful meetings. All subscribers who successfully complete the course are awarded a special B.C.G.A. certificate. This evidence of a good job well done must be a source of personal satisfaction to every subscriber earning it.

On the suggestion of the President, these two papers were not discussed. As a matter of fact, there was, as pointed out by him, no time for discussion.

What Birmingham is Doing.

The final paper of the conference was presented by Alderman J. H. Lloyd, M.A., Chairman of the City of Birmingham Gas Committee; the title being "Gas as a Public Service from the Municipal Point of View.—What the Gas Industry does for Municipalities, and what Municipalities can do for the Gas Industry." Alderman Lloyd was President of the Association in 1923, and has been on the Birmingham Gas Committee for 39 years, for some 15 of which he has been Chairman. The object of the paper was to record the progress of the industry in the past, its present position, and future prospects, and—by a plain statement of facts—to give some indication of the value of the industry to the country, to the municipality, and to the individual citizen.

The Birmingham Gas Department has done its utmost by its general policy, and by the operation of its Industrial Research Laboratories, to assist manufacturers to adopt modern methods. It is not too much to say that there are trades firmly established in the city to-day that would have gone elsewhere—even abroad—if it had not been for the skilled assistance given to manufacturers when their processes were being perfected. This progressive policy is reflected in the great increase in output of gas from the Department. The annual output has increased since Alderman Lloyd became a member of the Birmingham Gas Committee in 1891 from 4,000,000,000 c.ft. to over 14,000,000,000 c.ft.

Although the Birmingham Gas Committee have for years past been exerting all their influence to induce landlords of court and terrace property in the city to have such premises piped for gas—their automatic meter system includes the provision of meter, lighting fittings, and cooker—there remained until recently a fairly large number of courts, and other cottage property, still without a gas supply. Early last year, therefore, the Committee inaugurated a scheme whereby the Department install the gas pipes in the house, and are recouped by setting the meter to give a reduced quantity of gas per penny until the liability is liquidated. This has been taken up enthusiastically

The President, with Three Visitors from France and Mr. Cyril Davis.

by the tenants, and gas has been installed under this scheme in 18,000 houses, many of them in the poorest parts of the city.

In regard to street lighting, Birmingham is at present engaged in carrying out special lighting experiments for the Public Works Department in a road where the trams have been discontinued and the poles are available for lighting purposes. The Gas Department and the Electric Supply Department have each been allotted three stretches of road—one portion to be

lighted by lamps from brackets on every tramway pole, another portion with lamps suspended in the centre of the road, and another portion by lamps from alternate poles. The Public Works Committee, who undertake the lighting of the city, will decide what use is made of the respective methods of lighting, whether by gas or electricity.

Votes of Thanks.

Mr. John E. Daw: I have to propose a cordial vote of thanks to the readers of the extremely valuable papers we have

Preparing to Leave for University College, Hull.

heard for the trouble they have taken. We have learned a great deal with regard to the education of those whom we send out to represent us in the gas industry, and judging from the last paper I feel sure we have no reason to think that we are really going to expire.

Lieut.-Col. H. W. Woodall: It is a great privilege to me to second the vote of thanks. I am sure I am voicing the unanimous feeling of this meeting in saying that we as an industry are indeed fortunate in having such gentlemen as those to whom we have listened to-day to advise us on the direction and control of the course of our energies. What affords me most pleasure, as one connected with moderate sized gas under-

At the Sculcoates Gas-Works, Hull.

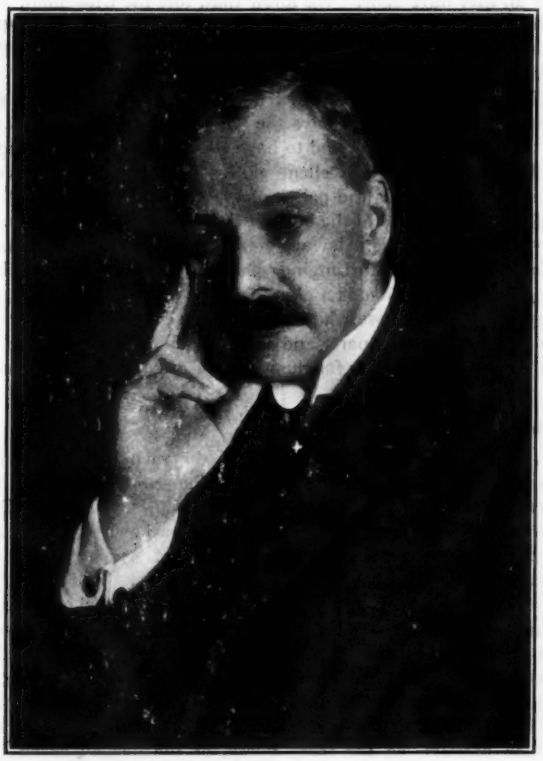
takings, is the assurance that in the proposed scheme for education of gas salesmen full provision is being made for the local education of the rank and file of the gas industry, on whom, in view of the enormous number of consumers whose business we require, the bulk of the selling must almost inevitably fall.

Mr. T. B. James: We cannot separate without expressing our hearty thanks to our excellent President. In all such meetings as this it is a very great thing to have a good Chairman—to have someone who keeps you up to the mark constantly. In this respect we have had an excellent Chairman. I therefore have the greatest pleasure in proposing a hearty vote of thanks to our President, for the admirable manner in which he has presided over the meetings of the conference.

Sir Francis Goodenough: I am sure you would all like to second that vote of thanks, but I am going to take on myself the privilege of doing so, because I do want to say on behalf of the Executive, on behalf of the members, and especially on behalf of myself, how much we are indebted to Mr. Woodall, not only for his conduct in the chair during the two days of our conference, but for all his help and encouragement and assistance, not only during the past year while he has been President, but during all the years he has been connected with the gas industry. Mr. Woodall bears a very honoured name in the gas industry and in this Association. He has fully carried out the tradition set by his father in the encouragement of every movement in the gas industry for its progress and development.

The vote was carried with acclamation.

The President: I thank you, Mr. James and Sir Francis, for this vote, and the members for the way in which it has been received. The only merit I think I can claim is that in conducting your meetings I have been able to do something to keep them up to time, and time has been rather important with us



THE PRESIDENT-ELECT,

Mr. John E. Daw, J.P., Chairman of the Exeter Gas Light and Coke Company.

at this conference, because, as you know, we have not all been able to be in the same place. Some of us have had to be in Bridlington and others in Hull, and there have been trains to catch by a good many people.

Luncheon at the Gas-Works.

Motor coaches then conveyed the members to the gas-works at Sculcoates, in the works dining hall of which luncheon was given by the President-Elect, the Vice-Presidents, and members of the Association to the Retiring President and Directors of the British Gas Light Company.

Mr. John E. Daw (the President-Elect) was in the chair, and proposed the health of Mr. Woodall and his fellow Directors—remarking upon the generous hospitality that had been extended to the Association.

Responding, Mr. Woodall said: On this occasion I am quite sure you would rather see our works than listen to a speech

from me. As Chairman of the Company, I am very proud of these works. I suppose I have had something to do with them as Chairman, although I do not know how far you give any credit to the Chairman. We have, however, in Mr. Copp a very able Manager, and we also have assistants who are extraordinarily good. I am sure when you go round the works you will realize at once not only that Mr. Copp is a very able Manager, but that he must also have the able assistants to whom I have referred. We are very proud of the way in which our works are run, and I think that when you see them you will believe that we have reason to be proud.

Sir Francis Goodenough: You have just listened to the Chairman of the British Gas Light Company, and he rightly indicated that, in addition to the Chairman, some credit is to be given for the good work of the Engineer. So also with regard to a conference such as this, credit must be given to those who work the machine as well as to those who pay for it. We have been most charmingly entertained by the British Gas Light Company, and the conference has been a very great success. A great deal of the credit for that is due to our friend Mr. Copp and his assistants Messrs. Weston and Robinson. We should not like to separate without having thanked them for all they have done. We know that, like the Chairman, Mr. Copp has great faith in the industry, but faith is of no avail without good works, and we are going to see good works this afternoon.

Mr. Copp: You have rather taken me by storm. I did not anticipate that I should have the honour of responding to such a toast, but I am very glad to have the opportunity of paying a tribute to my most excellent staff. They help me in every possible way. It is the policy of my Chairman and Directors to have things done in the best possible manner, and we always try to act up to this. I want you to understand that we have purposely avoided arranging personally conducted parties. You have in your hands a plan which shows you every point of importance, and those who are interested in any particular part can proceed to that part, and they will find someone there to explain it. Thank you for the very kind way in which you have received this toast.

The Showrooms.

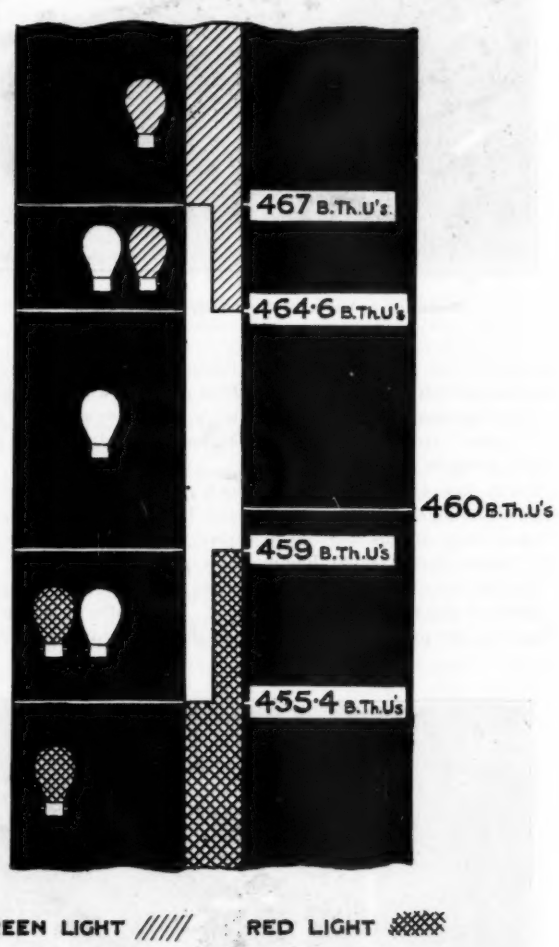
During the afternoon, many of the members visited the Company's showrooms, where the Superintendent, Mr. G. Perkins, and his able staff acted as guides. The building occupies a corner site in Prospect Street, a busy thoroughfare, and has an enviable length of window of which full use is made. The display plan followed both here and inside is sectionalization, and she (or he) who seeks a cooker finds it among other cookers, and not among the refuse destructors. In this way there are a coke window (showing, with graded coke samples, the ash-pan with its insignificant refuse from 24 hours' burning), a fire window, a lighting window, and so on.

Inside, there is an impression of comfort and spaciousness which permits, on the three floors, of the display of an immense selection of apparatus of all kinds without any crowding. It would serve no useful purpose to particularize—they cover every phase of gas supply, and they are artistically and temptingly laid out. One point may well be mentioned—the attention given to the lighting load. In addition to a standing invitation, prominently displayed, to try the gas switch, and a good range of switches with which to do the trying, there is a large selection of fittings and shades of all kinds and to suit all pockets, from the merely "pretty" to the highly artistic, on the selection and the display of which much care has obviously been spent.

To the sales minded gas man, the visit to these showrooms was an admirable round-off to the busy days of the conference.

Signal Lamps on Thomas Recording Calorimeter.

During the visit of members of the British Commercial Gas Association to the Hull Works of the British Gas Light Company on Wednesday last, much interest was shown in the signal lights indicating the readings of the Thomas calorimeter. Mr. H. E. Copp has sent us the accompanying diagram illustrating the system.



The circuit on the calorimeter is approximately 20 volts. The sliding pen attachment operates relays which light the white, red, or green lamps on the indicating panel, in the laboratory, and in each of the vertical retort houses simultaneously. The signal lamps are in parallel in a 220-volt circuit.

Complimentary Luncheon to Sir Francis Goodenough

On Tuesday, Oct. 28, a Complimentary Luncheon was given to Sir Francis Goodenough, C.B.E., in the Alexandra Hotel, Bridlington—the PRESIDENT (Mr. Henry Woodall, J.P., M.Inst.C.E.) in the Chair.

After the toast of "The King" had duly been honoured,

The PRESIDENT said: "I would like first of all to offer a very hearty welcome to our French colleagues who have come over here for this occasion. We have with us M. Sellie (President of the French Institution of Gas Engineers), M. Saint-Just (of the Paris Gas Company), and M. Mougin (Secretary of the French Institution of Gas Engineers); and we offer them a very hearty welcome indeed.

I would like now to read you one or two letters which I am sure you will wish to hear from several of our Past-Presidents. The first is from Sir David Milne-Watson, who says:

> I regret that pressing business in London arising out of our new issue of debenture stock renders it impossible for me to be present at the luncheon at Bridlington in honour of Sir Francis Goodenough.
>
> I should have liked particularly to be present in order to convey once more my sincere congratulations to Sir Francis on the signal honour which has been bestowed upon him recently by H.M. the King, and I should be glad if you would read this letter to the gathering so that I, though absent, may join with his many friends in conveying to him our good wishes and our hope that he will long be spared to enjoy this honour.

I have also a letter from Alderman Lloyd, of Birmingham, Past-President, who writes to Mr. Mason as follows:

> I much regret that I shall be absent from the luncheon next Tuesday in honour of Sir Francis Goodenough.
>
> During the year that I had the honour of being President of the B.C.G.A. I had ample opportunity of seeing his work for the cause, and was much impressed by his zeal, ability, and enthusiasm.
>
> Since that time, he has been much more before the eyes of the public, and has gained the esteem and personal goodwill of a very much larger circle.
>
> I cordially unite with the expressions of congratulation and good fellowship which will, no doubt, be given utterance to at the luncheon.

Another letter is from Mr. Alfred Procter, another Past-President, and Chairman of the York Gas Company, who also writes to Mr. Mason as follows:

> I am very disappointed that in consequence of an old-standing official engagement I cannot be present at the luncheon and well-earned presentation to Sir Francis Goodenough on Tuesday.
>
> I have been a regular visitor to the annual conference of our Association, and it has always been one of the great pleasures of those events to come into personal association with Sir Francis.
>
> We have had two memorable conferences in our old city—one in celebration of our centenary, and the other the annual meeting of 1928—and we have every reason to remember how greatly their success was due to the Executive Chairman.
>
> His unique capacity for management and direction and sound policy have always impressed me profoundly, and I have learnt to value very highly his personality and friendship.

Yet another letter comes from Mr. J. H. Ellis, Past-President, and Chairman of the Plymouth Gas Company, who writes to myself in the following terms:

> I profoundly regret that circumstances wholly beyond my control prevent my attendance at the annual meeting of the B.C.G.A., which under your wise and experienced lead will, I am sure, prove of the greatest benefit to the public and to our industry
>
> I had been looking forward to sharing with you and the delegates supporting you the pleasure of acknowledging Sir Francis Goodenough's eminent public services and the debt we owe him for his sustained and brilliant advocacy of our cause for a long series of years. But this is impossible.
>
> Having been privileged to fill the office you now hold, I speak with gratitude of his kindly guidance, his genial courtesy, his loyal friendship, and his ripe and varied knowledge.
>
> My inability to be with you is a great disappointment to me, and I am only able imperfectly to express by this letter the cordial appreciation I entertain with every member of the industry he has served so well on the honour His Majesty the King has conferred on him.

Finally, I have a letter from Alderman H. Wade Deacon, Past-President, and Chairman of the Liverpool Gas Company, who has written to Mr. Mason as follows:

> It is with sincere regret that I find myself unable to attend the annual conference at Hull, and I am especially sorry because

[Photo. by Vandyk, 41, Buckingham Palace Road, S.W.

SIR FRANCIS GOODENOUGH, C.B.E.

I shall not be present at the luncheon to Sir Francis Goodenough, a man whom all connected with the gas industry delight to honour.

I shall never forget the invaluable support he gave me during my year of office as President. Indeed, it is no exaggeration to say that without his wise advice and ever willing help it would have been impossible for me to have performed the duties of the office.

I join in spirit with you all in wishing health and happiness to your honoured guest.

Continuing, the President said: It is a very great pleasure for me to be here to-day. The position of President of this Association entails duties as well as privileges, but it is a privilege as well as a pleasure to be in the chair to-day, and on your behalf to welcome our guest, Sir Francis Goodenough, and to tell him how much we value his services to us, and how delighted we are that his services outside the industry have been appreciated, and to such a degree that he had had the honour of Knighthood conferred upon him. Sir Francis has spent all his life in the gas industry, and although we, his friends, know his worth, at the same time we recognize that he has done something—in fact, a very great deal—for the development and encouragement of salesmanship outside our own particular industry.

Sir Francis is never idle, and the time he might have spent in well-earned leisure he has largely devoted to public work. Knighthoods are not bestowed, and rightly so, for simply doing one's own work, but are given for important services to the community. Sir Francis' qualities have been observed, or he would never have been appointed Chairman of the Committee on Salesmanship set up by Lord Eustace Percy; and it is largely for his special work that our friend has been so highly honoured.

For the last forty odd years, Sir Francis has worked with and among us, and made many friends, and it is those friends of everyday life who have gathered together to-day to do him honour and to ask his acceptance of the gifts which, on your behalf, I now have the greatest possible pleasure in handing to him. The first is a small jewel for Lady Goodenough. It is a replica in diamonds of the badge which is worn by Knights Bachelor. I am sure Lady Goodenough will appreciate it, and all the more because of the happy idea which originated in Sir Francis's fertile brain. The other gift is a very beautiful piece of silver plate. We are told it is more blessed to give than to receive, but it is such a delightful piece that I feel that axiom is not always right. However, there is no getting away with it, so I hand it over to you, Sir Francis, who, I know, can and will appreciate it. In the envelope you will find the balance of the subscription in the form of a cheque. The number of subscribers was nearly 500 from all over the country; and much as you will value the gifts, you will, I feel sure, be even more pleased to think that so many of your friends have joined together, as is engraved on the salver, to show their high appreciation:

Presented to Sir Francis Goodenough, C.B.E., by many of his friends in the gas industry to mark their high appreciation of his services to the industry as well as their pleasure and satisfaction at the honour of Knighthood recently conferred upon him.

I will now ask Mr. Alderman Phillips, a Vice-President and one of the oldest and most valued friends of the Association, to second my few remarks, after which we will join in drinking the health of our honoured guest.

(Sir Francis was given a warm-hearted reception when the President handed him the two gifts.)

Alderman F. S. Phillips: It is a very great pleasure indeed to be allowed to address this assembly upon an occasion like the present, and it is also rather embarrassing, because so much has been said already that one can only in some measure repeat what has already been so well said, and I do not intend to keep this assembly very long. The only reason I am able to find why I should be selected to support this toast, which I do most heartily and most sincerely, is probably that some 19 or 20 years ago I was present at a meeting with Mr. Goodenough and some other friends representing gas undertakings where the question of the formation of an Association was considered and decided upon; and that Association received the name of the British Commercial Gas Association. From its inception it was very sturdy and very vigorous, and I am happy to say a very useful Association to the industry as a whole. It grew year by year, and its influence has extended until we have such a magnificent assemblage as we have here to-day representing the B.C.G.A. We used to be able to meet in a small room at the beginning; but we cannot meet in a small room now. Not only has the personnel increased, but I venture to think that the usefulness of the Association has grown in full measure with it. Associations, however, do not grow by themselves. They only grow because there is an influence and a purpose and an energy and a considerable amount of thought put into them. Mr. Goodenough was on the scene at the formation. He was the inspiring person in its formation, and he has been the inspirer of the Association from that day until to-day. Moreover, although the scene of operations of his own Company is very large and very responsible, nothing has ever been too much for him to undertake on behalf of the Association. He has never shown any reluctance to help forward his brethren of the gas industry, and at all times he has given his services, freely, willingly, and thoroughly in building up this Association. When I think of to-day and of 20 years ago, I wonder what the gas industry would have been like in face of the great competition we have and the greater competition which is to come, if we had continued to work in isolated units instead of being united in an Association, one helping the other, friendly among ourselves and able to present a united front to the competition which we have to meet. [Applause.] All this is great work well accomplished. It reminds me of the factories in my native County, Lancashire. When you go into one of these immense buildings you see machine after machine, and you pass from room to room and see the wheels going round and the operations going on, but eventually you come to one part of the building—namely, the power house—and there all the motive power which sets the whole factory in motion and keeps it in motion is generated. That is exactly the part which Sir Francis Goodenough—and I am glad to call him by that title which is well deserved, worthily earned, and will be worthily worn—has played in connection with the British Commercial Gas Association. He has been the power house of the Association, and we owe him a debt of gratitude which no words from me, at all events, can adequately express. I want to say heartily and sincerely that we wish Sir Francis many years to wear his well-deserved honour, that his influence may continue to be exercised on our behalf, and that he may have health and happiness for a long time to come. I have pleasure in supporting the proposition.

Sir Francis Goodenough, who on rising to respond to the toast again received unmistakable demonstration of the affection and goodwill felt towards him by the industry—the company singing "For He's a Jolly Good Fellow"—said: I am sure you will all sympathize with me in the difficulty I find myself in, in trying to express to you my feelings at this moment. I have for 22 weeks to-day—that being the length of time since I received the Prime Minister's letter—been filled with amazement, apprehension, gratitude, and happiness.

I have been filled with amazement to find myself honoured by the King and my country with a Knighthood; amazement, indeed, when I look back for the 42 years that have passed since I first walked into Horseferry Road as a humble junior clerk at £40 a year, and find myself where I am to-day. I was reading the other day a book by Priestley—"Angel Pavement"—in which one of the characters speaks of having arrived, after 35 years, triumphantly at the head of the staff of his firm, in which he had started as an office boy. It was said of him that "somewhere at the back of his mind that little office boy still lived, to mark the wonder of it." Somewhere not very far oft in my mind still lives the little junior clerk, to mark the wonder of to-day.

Apprehension I have felt and still feel lest I should have to take a bigger hat—[laughter]—and I have added to my litany the prayer: "From puffed-up pride or swollen head, good Lord deliver us." [Renewed laughter.] I do hope that none of my friends—thank God there are many—in the gas industry will ever find me any different from the Frank Goodenough they have always known. [Applause.]

Then, especially, my mind has been and is still filled with gratitude. As I told Sir David, the first thought that crossed my mind when I heard of my honour was one of very deep gratitude to him, as Governor of the Gas Light and Coke Company, in particular, and to the rest of the Board of Directors, for their broad-minded generosity in allowing me to perform public service which has—I hope it has—earned me the honour that has come to me. Without their generous permission and their generous consideration, of course, I could not have done either for the industry or for the country any of the work I have been allowed to do.

Looking further back in memory, my gratitude is very great to our President's father, Sir Corbet Woodall. It was due to Sir Corbet—Mr. Woodall as he then was—that the Gas Light and Coke Company decided 27 years ago to establish a new Department for the development and maintenance of business and appointed me to take charge of it. It was thanks to his encouragement and help that the B.C.G.A. was formed and that I was allowed to take the Chairmanship of the Executive—from which you have not yet expelled me. The Tottenham Company, of which Sir Corbet was then Chairman, was the first Company to announce that they were prepared to subscribe 2s. 6d. per million to the Association which was then in contemplation; and, may I remind this audience here in Yorkshire that it was a Yorkshire Corporation, Doncaster, that was the first to add a municipal subscriber to the list. It was our President's father who presided over the first Conference of this Association in 1912; and it was very largely due to his support and approval that I was able to carry on the work which I had undertaken for the Association. So you see I have, moreover, reason to feel, and do feel, a very great debt of gratitude to this Association for having, in the first place, chosen me as their Chairman, and then, much more important, given me for 19 years their confidence and their support, because it was the work that I undertook for this Association that really led to all the other work that has

come to me. At the meeting of the Institution of Gas Engineers over which our President's father presided in 1913, I read a paper on the education of staff which had something to do with my being honoured by the Institution in being made Chairman of their Education Committee, 7 or 8 years ago. It was also through my association with the Board of Education (as a result of that position) and through my being elected as Chairman of the Sales Managers' Association because of my work for the B.C.G.A., that I was ultimately chosen as Chairman of the Committee on Education for Salesmanship—an appointment which has led to my standing here to-day and offering you my sincere thanks for your kindness.

Above all, happiness has filled my heart, and fills it especially to-day, because of the great kindness I have had from all my friends. From the moment the honour conferred upon me was made public, I have been overwhelmed with kindness, and I am very glad of this opportunity of thanking you all again for it. No honour is worth having unless it is endorsed by the opinion of one's friends, of those who really know one. [Applause.] No honour is worth having unless it is backed by friendship. Many times during the last few weeks have I thought of the four lines which Hilaire Belloc wrote:

> From quiet home and small beginning,
> On to undiscovered ends,
> There's nothing worth the wear of winning
> But laughter and the love of friends.

It is because I feel that the beautiful gifts which you have lavished upon me to-day—and through me upon my wife who will be very proud of them—stand for the affection of a great many friends that I value them so highly. I regard them not as payments for services rendered—services gladly rendered without hope of fee or reward—nor as a retaining fee for services to come, though I hope I may, as long as you wish to have me, be spared a long time to serve this Association. I regard them rather as emblems of your friendship, and as such I shall value them and shall remember with pride and happiness this occasion as long as memory endures. [Loud applause.]

Annual Report and Accounts of the Association

Sir FRANCIS GOODENOUGH: It is my pleasant duty to present to you the Annual Report of the General Committee and the Audited Accounts for the past financial year. As these have been printed and circulated, may I ask if you will agree that they should be taken as read?

This was agreed to.

Extracts from the Nineteenth Report.

The total income amounts to £65,302, representing an increase of £300 over the previous year, and an increase of £14,700 and £23,900 over the two years ended March 31, 1928, and March 31, 1927, respectively. These comparisons are quoted to draw attention to the increased income resulting in the previous years from the higher rates per million c.ft. on which undertakings were asked to subscribe.

The increased subscriptions paid in 1928-29 have been renewed in the present year, and amount to approximately £10,000 of the total income from subscriptions. On the average, subscriptions during the past year have not been paid on an increased output, with the result that the Association's income has not materially increased on that account.

The Association continues carefully to watch for and take every opportunity for securing new subscribers. Happily, with membership already representing 96 p.ct. of the make of gas in the country, effort in this respect is limited; we now have, without exception, the name of every important undertaking on our membership roll, to which have been added during the year a further twenty-three smaller undertakings.

The sales of publicity material reached the record total of £18,230, showing an increase of over 26 p.ct. on the previous year.

Education for Gas Salesman.

The Executive have set up a special Sub-Committee to prepare a scheme of education for gas salesmen.

The Industrial Salesmen's Circle continued to do good work in co-ordinating the experience and views of those specializing in the development of the sales of gas for industrial purposes. The Association is fully represented on the Joint Committee set up, on the initiative of the National Gas Council, to consider ways and means for further developing this very important and promising field.

The Association is also represented on the Committee of the National Gas Council which is taking into consideration the recommendations of the Departmental Committee on Gas Poisoning. The subject is being dealt with conjointly with the Joint Committee on Gas Heating.

The Association's negotiations with the Ministry of Health in regard to by-laws relating to the ventilation of buildings and gas apparatus have continued during the year.

The circular, wherein are set out recommendations for the framing of By-Laws, issued recently by the Ministry and circulated to Local Authorities, is having careful consideration and attention.

The Association is making careful inquiry into the practical possibilities of the production and display of films for educational and propaganda purposes.

Vice-Presidents.

The following have been added to the list of Vice-Presidents of the Association during the past year:

Mr. Astley Bell (Preston).
Councillor H. H. Cheshire, M.B.E. (Coventry).
Councillor A. E. Farlow (Birkenhead).
Dr. T. A. I. Howell (Wandsworth).
Councillor Houghton Johnson (Blackburn).
Mr. H. Stanley Taylor (Bath).

Obituary.

During the year the Association has lost valuable supporters and friends in the passing of Sir Thomas Paxton (Glasgow), a Past-President; Sir Lawrence Weaver, K.B.E., a Director of the Association's Advertising Agents, who was a valued and sincere friend of the gas industry, in which he had made many friends; Alderman J. C. Purser, late Chairman of the Warwick Gas Company; and Mr. Norman S. Cox (Sunderland), Mr. H. W. Packham (Kingston-on-Thames), and Mr. E. P. Vince (Minehead), all of whom were members of the General Committee, and Mr. Samuel Glover, M.Inst.C.E., Past-President of the Institution of Gas Engineers.

The Next President.

Mr. John E. Daw, J.P., has consented to be nominated for election as President for the year 1930-31.

Sir FRANCIS GOODENOUGH: Before moving the adoption of the report and accounts, I would like to make a few observations relative to them. Both income and membership show a steady increase, and this provides the best practical proof that the necessity for the Association and its value to the subscribers continue to be recognized in growing measure. We have never looked back, in membership or in income, since the Association was launched nineteen years ago. But that is no ground for complacency or slackening of effort; it is only encouragement to increase our efforts and to attempt to give the industry better service still in the future, within the limits—the far too narrow limits—of our resources.

The report and accounts constitute a record of some of the services rendered to the industry in return for the income subscribed, but, as the report reminds members, "much work of great importance and value to the industry is done which does not lend itself to being detailed in a published report." We are sometimes criticized because we are thought not to be doing something which we are doing, but which it would be impolitic to discuss in public. At other times we are criticized for not doing something which there are good reasons for not doing; yet those reasons cannot with advantage to the industry be explained in the Press. Let me just say to some of those critics in the most friendly way that, while we welcome criticism and suggestion, and always give full consideration to both, we have no intention of being goaded into injuring the industry in order to make interesting "copy;" and let me ask them to consider quietly and seriously the purpose for which they exist and are supported—viz., to serve the true and abiding interests of the gas industry. Of those interests they are sometimes the best judges whose mouths are closed by reasons of policy. Let me just add that, while newspaper comment is of great value, newspaper dictation of policy is, in my opinion, no more good for an industry than for a nation. We are fully appreciative of the splendid services rendered to the Association and the industry by our Technical Press. Our relations with them have always been of the most cordial, and I am sure they will continue to be so in spite of the disagreement as to policy to which I have given expression in a spirit of perfect friendliness, knowing it will be so received.

The report tells a gratifying story of increasing use by members of the various services the Association can render to them—a large increase in publicity material sold (an increase of no less than 350 p.ct. in ten years), though there are still a surprising number of undertakings who make little or no use of such an invaluable publication as "A Thousand-and-One Uses for Gas;" a constant growth in requests for assistance by the

editorial staff and by technical experts; growth everywhere, indeed, in the services rendered in return for subscription paid. At the same time, only one undertaking in six purchases the periodical for circulation to its principal consumers. When I tell you this, you will understand that I have some reason for what I have just said with regard to "A Thousand-and-One Uses for Gas;" but I can say on behalf of an undertaking which does circulate that publication to all its principal industrial and commercial consumers, and to architects and doctors, that those who are not doing so are missing a very important means of publicity and the creation of goodwill.

The Association has not done more than at most 20 p.ct. of the national and district advertising that could have been done with great profit to the industry. The advertisements have been too small in size, too infrequent in appearance, and have appeared in far too few newspapers and periodicals. If the Association had done five times as much advertising as they did last year, the benefit to the industry would have been twenty times as great. Why has the advertising done been so inadequate in size, in frequency, in publications used? Simply because our income has not been bigger than it has been. Please think this over, everyone in the industry, here and elsewhere—especially those of you who are not as yet subscribing on as high a basis as the majority. Now is the time for us to advertise adequately, while the harvest is still to be reaped; not in ten years' time, when our present opportunities have been seized, to their profit, by others.

Another direction in which the Association has failed—and always must fail—is in that of doing for gas undertakings that which they alone can do for themselves. No action by a national organization, no advertising or propaganda directed from a national centre, can win for a gas undertaking the satisfaction and goodwill of its customers which are the only sure foundation for any business, and which can only be won and maintained by constant and complete good service, by individual courtesy, by attention to the individual customer, and by local advertising, local propaganda, and local civic popularity.

When competition comes where it has not been before, or when mild competition becomes severe and threatening, the Association will always do, as it is doing, its very utmost to help the local undertaking to meet the situation; but this help can do little if the goodwill of the public be lacking. We receive only too often evidence of the fact that in all too many districts the cultivation of goodwill through good service has either been neglected or but half-heartedly undertaken. "For ten years," wrote a customer the other day, "we have been trying to get decent service from the gas company, and we are viewing the approach of the electric grid with relief and anticipation"—and when Nemesis comes near it is little use asking us to remedy the results of years of neglect.

Let me once again beg every gas manager in the country to put himself into line with those of his colleagues who, through a constant service of good gas at good pressure, through a system of maintenance of fittings and appliances, and through unfailing courtesy and promptitude of attention to their customers' needs and wishes, have built up a wall of goodwill around their business which competition will find hard to surmount. The friendship of the customer is the very bedrock of business prosperity, and it can only be cultivated by the local undertaking, not by any national organization.

I beg to move that the Report and Accounts as printed in the current issue of the "Bulletin" be approved and adopted.

Mr. W. J. SANDEMAN: I have much pleasure in seconding the motion for the adoption of the Report and Accounts. I do not propose to say anything in detail, because Sir Francis has dealt fully with all the points; but, as Hon. Treasurer, I should like to assure members—if, indeed, any assurance is needed—that every farthing subscribed to the Association is spent to the very best possible advantage.

Mr. A. W. SMITH: I have much pleasure in supporting the motion. I do not think anyone can add much to what Sir Francis has said, although I should like to emphasize the point he drives home at every annual gathering—and that is the necessity for cultivating the goodwill of your own particular consumers in your own district. The Association cannot help you if you do not help yourselves. That is really what it amounts to. I should like also to add, for Sir Francis' own special benefit, that my own Committee has recently decided to increase its subscription to 7s. 6d. per million; that is the way in which they value the work of the Association.

The PRESIDENT: I will now move:

> That the Nineteenth Annual Report of the General Committee and the Statement of Accounts for the year ended March 31, 1930, as printed in the "Bulletin" for October, 1930, and circulated to members, be adopted.

The motion was carried unanimously.

Dinner to the B.C.G.A.

On Tuesday, Oct. 28, the Chairman and Directors of the British Gas Light Company, Ltd., entertained the members of the Association at Dinner at the Guildhall, Hull—Mr. HENRY WOODALL (Chairman of the Company) in the chair.

After the Toast of "The King" had been honoured,

EFFICIENT USE OF FUEL.

Mr. JAMES F. RONCA, O.B.E. (Director of Gas Administration, Board of Trade), proposed "The Gas Industry," and said: The Department which I have the honour to represent—the Department of Industries and Manufactures of the Board of Trade—as its name suggests is charged with looking after the industries of our land in so far as they can be properly looked after by any Government Department. [Laughter.] In fact, we are a kind of serving maid to the Marthas of civilization. The Marthas make it possible for the Marys to live. In early times the thing that distinguished man most clearly from the beasts of the forest was the fact that he used fire; he was, in fact, a fuel consumer. That is a geological age ago, but I would venture to suggest that even to-day you might look far and yet find no better index of a country's advancement than is to be found by considering the manner in which it utilizes fuel. A country that is utilizing its fuel and its power resources inefficiently, I think we can truly argue, is going to be a backward country. As long as we live in circumstances which make us think, whenever the word combustion is used, of something burning in a gaseous atmosphere, the chances are that fuel can only be used really efficiently and conveniently if it is a gaseous fuel. It is going to be much more difficult to burn solid fuel efficiently. You are all concerned in an industry producing and distributing a product which enables people to burn fuel efficiently. It enables them to carry what I have suggested is the hall-mark of civilization. Your industry enables even the small consumer to cook his dinner, warm his body, and forge his tools and implements without fouling the countryside with soot, without wasting the fertilizers with which our fields cry out to be fed, and without destroying the sermons on stones which the masons of the past have left to us. Mr. Chairman and Gentlemen, I wish your industry well; may your industry progress as you yourselves would wish it to progress. In the future may you find leaders as you have to-day, leaders who are prepared to spend themselves and their possessions not only in the advancement of the technical requirements of the industry, but in trying to ameliorate the general conditions under which the industry has to operate.

CHANGED CONDITIONS.

Mr. ALFRED PROCTER (Chairman of the York Gas Company, and Past-President of the Association), responding to the toast, said: We recognize Mr. Ronca as the Director of the Department of the Board of Trade which is set up to supervise our activities, and we know that it is his duty to keep a very careful watch on our operations, to see that we do not overstep the bounds which Parliament in its wisdom has set to our activities and our operations. I venture to say, and I hope Mr. Ronca will agree with me, that the gas industry does not give him very much cause for anxiety in the discharge of his onerous duties. At the same time, I cannot help saying on this occasion that we, the administrators of the gas industry of this country, do feel restive, and do chafe under the shackles which are laid upon us by Parliament in the conduct of our business. We feel that, although it might have been necessary in former times that some restrictions should be placed upon the gas undertakings to protect the innocent consumer and ratepayer from their depredations, in these later days no such cause exists. The reason for that is that the supply of gas is no longer the monopoly it was for many years; that it is the subject of very serious and very keen competition; and that the public are sufficiently protected by that competition. They do not need any special protection in the way of restrictions upon the way in which gas undertakings shall carry on their businesses. We do claim to have this recognized by Parliament to-day; if we could be freed from these shackles and restrictions, we should be able to extend the great service which we are giving to the public, and do it with more economy than we are doing at the present time. ["Hear, hear."] Of the gas industry we are justly proud. It has grown in spite of its difficulties, and it has overcome these difficulties by the resource and energies of those who direct it. The result is that to-day we find it one of the great services of the country. It has grown largely and mainly because of the inherent possibilities of the industry, and it has great capacity for still further expansion. It has great elasticity; and we have to-day an industry which is rendering enormous public service to the community and is

ministering to the daily needs of the people in their domestic and industrial concerns.

This is our annual conference, and our minds naturally turn to the men who have done so much for it. We remember with gratitude and appreciation all that Sir David Milne-Watson has done for us in times of stress and storm in the years gone by. We are also grateful for the work done for the Association by Sir Francis Goodenough. To my regret I was not able to be present during the earlier part of the day when you did honour to him, but I should like to take this opportunity of adding my testimony to the unanimous chorus of praise and admiration and congratulation which he received in the middle of the day. [Applause.] Sir Francis has devoted himself more especially to that department in which he is a past master—the department of salesmanship. We all know it is no use for our engineers to make the best product if we cannot sell it to the best advantage; and it is to this department that Sir Francis Goodenough has devoted himself.

Education of Salesmen.

As you know, there is a scheme on foot, and the details have practically been laid down, for the education of gas salesmen; and in addition to what we have done to-day to honour Sir Francis, the gas industry wishes to express its wholehearted appreciation of his enormous services to the work of the education of salesmen, which he has inaugurated. I venture to say that the great ideal which the gas industry has set before itself is the ideal of public service; and when I see our President in the chair to-night my mind goes back to a Conference when our President's revered and honoured father was President, and when he sounded a note of inspiration to the industry which has been absorbed and acted upon by the industry ever since. The late Sir Corbet Woodall told us that the birth of this Association was the birth of a new era in gas policy, and he exhorted us to make the ideal of service to the public our great aim and our great ideal in carrying on the business. I venture to think that that has been done, and that all in the gas industry to-day are imbued with that ideal. We believe that gas is the up-to-date fuel and the fuel of the future.

The City of Kingston-upon-Hull.

The President, proposing the toast of "The City of Kingston-upon-Hull," said: It is now my privilege and pleasure, as Chairman of the British Gas Light Company, to welcome you here to-night on behalf of myself and my fellow-Directors, to propose prosperity to the City of Kingston-upon-Hull, and to couple the toast with the name of Councillor R. Richardson, the Lord Mayor. Some of you perhaps are aware that Kingston-upon-Hull received its name from King Edward I., about the year 1299. It was not until the reign of Henry VI. that the City received its Charter, and this was the first English Charter of Municipal Incorporation. It would take too long, and this is hardly the time, to tell you of the many important industries of Hull—of its great docks and fishing fleet; its University and Art Gallery, provided largely by the splendid generosity of the Right Hon. T. R. Ferens, whose death was an incalculable loss to the city. I would like to mention one of the important public institutions in Hull—namely, the Sailors' Orphans' Homes—because it enables me to name our old and honoured friend Mr. John Young, the Hon. Secretary of the Institution, at one time our Engineer at this, the most important, station of the British Gas Light Company. It would, I think, be regarded as unforgivable if, in speaking of Hull, I did not mention the gallant lady, Miss Amy Johnson. She is a native of this city, and Hull is proud of her daughter. In welcoming you on behalf of the British Gas Light Company, I should like to thank the Corporation for allowing us the use of this beautiful Guildhall. In the history of England our municipalities have played a great part. The dignity and beauty of their buildings and the stateliness and ceremony of their proceedings are part of our national life. The British Commercial Gas Association has been entertained before by great municipalities, and we regard it as a high compliment that our Association is regarded as worthy of the treatment we have received. It is over a hundred years ago since the British Gas Light Company started its operations here, and I hope it will be agreed that the part we have taken in supplying light, heat, and power in the form of gas to the citizens of Hull is a part that has been well and fairly played. For some 37 years we have had to compete with the Corporation Electricity Undertaking. In spite of the competition, which has doubtless been to the benefit of the consumer, we have always been friends. We perhaps sometimes think that we might be given a little more credit for our long service, and be given more opportunities of discussing the position from time to time from an economic rather than a competitive standpoint. In conclusion, my Lord Mayor, I should like to remind our friends, some of whom may not be aware of the fact, that you are Admiral of the Humber, and that you have jurisdiction upon its wide waters independently of any other of the King's Admirals. One thing I have always admired about Hull is that it has its own telephone service, and I may say we here get an admirable service at two-thirds the cost of the national service. I do not know how, my Lord Mayor, you have been able to defeat the Postmaster-General, whom I am sure must have tried to get you into his net; but I imagine that it is not easy to treat arbitrarily a Lord Mayor, and when he is also an Admiral, I suppose one treads somewhat gingerly when approaching him. I have much pleasure in proposing prosperity to the Corporation of the City of Hull; and, on behalf of those here present, I thank you, my Lord Mayor, for your most kind hospitality, for the use of your splendid buildings, and especially for your presence here to-night.

Councillor R. Richardson, J.P. (Lord Mayor of Kingston-upon-Hull), responding to the toast, said: My first duty is to thank you, Mr. President, for the felicitous way in which you have proposed this toast, and all present for the appreciation they have shown for the city which I have the honour this moment to represent. You have said with truth that we date our history as a community back to 1299; and you see on the walls of this hall records of the many families who have written their names large on the pages of our national history. I do not propose to go in any great detail into this, but in the Chamber, marking their Association with Kingston-upon-Hull, there are, for instance, the arms of the Cecils, the Delapoles and others, and the famous or infamous Earl of Strafford, among the people who gained more or less fame and who did more or less well for their country or did well out of it. [Laughter.] At any rate, they were prominent figures of their time and generation. We have not, however, entirely lived in the past in Hull; and we do claim to be a progressive community. We had a very interesting lecture last night by Dr. Saleeby, when the advantages of air and sunshine were stressed, and I say that within the last two decades in Hull we have built wide and spacious streets through what were congested and disease-ridden slums. The district immediately around the Hall where I had the pleasure of receiving you last night is one instance. Adjoining that you have two or three wide streets which not long ago were slums; and I am pleased to say that the man to whom, above all others, this effort is attributable has not only lived to see his schemes finished and successful, but is with us to-night in the person of my right-hand neighbour, Sir Alfred Gelder, whom the City delights to honour. [Loud applause.] The President has referred to an Institution that we in Hull regard with great affection—the Sailors' Orphans' Homes—and that affection is in no way lessened by the fact that there is a close association between the gentleman who does so much for those Homes, Mr. John Young, and the gas industry, and he has undoubtedly endeared himself to the hearts of all of us who come into contact with him. I personally regard his genial personality as a distinguished asset to the city. The President has also mentioned our telephone service and wondered how we manage to keep out of the hands of the Postmaster-General. We do that very largely by paying for it. [Laughter.] In addition to providing what we consider a very efficient service at a very much reduced cost, we also pay His Majesty's Government, in the person of the Postmaster-General, a very considerable sum by way of royalty. It has been a source of great satisfaction to us as citizens, not only to have extended to you the hospitality of these buildings, but also to have been allowed to share as part venue of your Conference. I speak sincerely when I say we are grateful to you for coming here. I say that we admire your energy, and we applaud your undoubted efficiency. We feel honoured to have received the personnel of such a distinguished organization, and we are grateful for the interest you have shown in our city.

Mr. Harold G. Palmer (Deputy-Chairman of the British Gas Light Company) proposed "The Visitors," coupled with the name of Councillor F. Till.

Councillor F. Till, J.P. (Sheriff, City of Kingston-upon-Hull), responding to the toast, said: Sir Francis Goodenough said yesterday that we need trained men and women. I believe that above everything else we need to appreciate the value of research. It seems to me that organized scientific research in our great laboratories holds out two of the keys of life for the man in the street—human health and wealth. If only commercial men will encourage the men with brains—the chemists and the men who put their utmost into their work in the laboratories—then I am certain this old country will prosper as it never did before. [Applause.] I would like to say that the hall in which we now sit is built on the site of the original Hull Gas-Works; and we do feel honoured by your presence here to-night.

The Hull Station of the British Gas Light Company.

During the Conference of the B.C.G.A., opportunity was afforded of visiting the Hull Works and Showrooms of the British Gas Light Company, Ltd.

Though the British Gas Light Company was formed in 1824, it was not until 1825 that coal gas works were erected at Sculcoates on the banks of the River Hull. Prior to this, gas was produced from whale oil. The original site has been largely extended, and the area of the Hull Station is rather more than 41 acres. The area of the district of supply is 19·8 sq. miles, with 233 miles of main.

Coal required for carbonizing is drawn almost entirely from the South Yorkshire Collieries, and about 35 p.ct. of the total quantity reaches the works in craft alongside the Company's wharf, which has a length of 90 yards, on the River Hull. These cargoes are discharged by hydraulic cranes with hand-filled skips carrying 10 cwt. of coal; and after they have been weighed over an Avery semi-automatic scale, they pass through to the coal stores by an underground rubber belt conveyor, or alternatively can be tipped direct into wagons for delivery to the receiving hopper for the retort house elevator.

Deliveries of coke, refined tar, creosote, and pitch are made into craft; for the liquid products and also for deliveries of gas oil, pipelines connect the wharf to storage tanks.

The balance of coal is delivered by rail; and a works system of railway track, the total of which is 2 miles, enables coal to be delivered to retort houses or stock as required, while coke, sulphate of ammonia, tar products, as well as materials required for extensions and repairs, are easily and economically handled.

As one enters the works from Bankside, the office block and stores are on the left, while to the right is No. 2 Retort House and coal stores, which is complete with coke screens and storage bunkers of a capacity for 48 hours' carbonizing output. No. 2 Retort House, Woodall-Duckham vertical retorts, has a capacity of 3 million c.ft. of gas per 24 hours, and is fitted with waste-heat boiler installation by Spencer-Bonecourt, Ltd., to the designs of the present Hull Station Engineer.

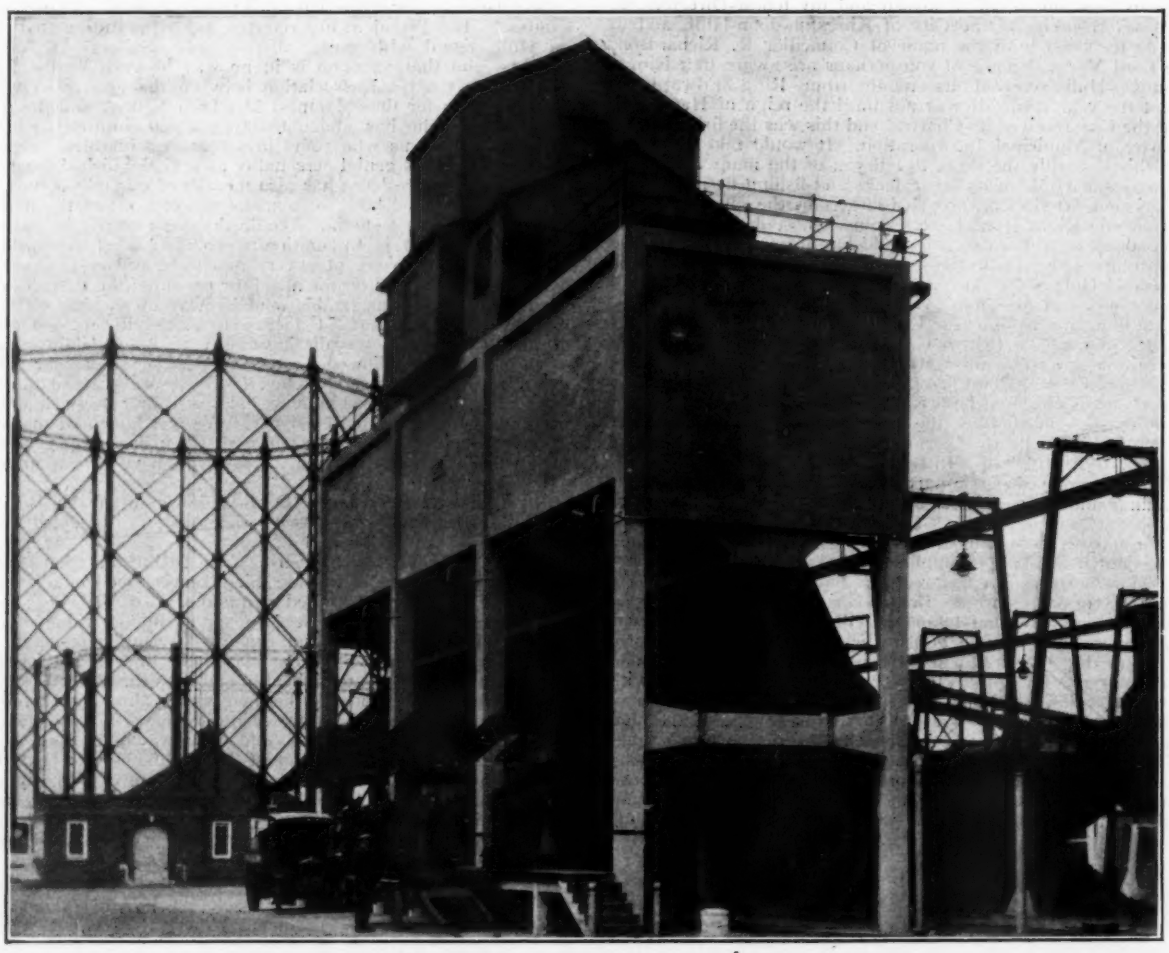
Lying alongside to the north east of No. 2 is No. 1 Retort House, containing inclined settings of beds of 8 retorts of nominal capacity 1½ millions per 24 hours.

No. 2 Coke Screens and bunkers occupy a prominent and easily accessible position for both road and rail transport. The concrete bunkers are lined on the hopper portion with 1½ in. blue Staffordshire tiles. The coke is screened to three sizes: Over 2 in., 1 in.-2 in. and ⅜ in.-1 in.; the breeze below ⅜ in. passes in electric battery trucks to the central (Babcock & Wilcox) boiler. Increased domestic demand has resulted from grading the coke, and there is a distinct reduction in the breeze made.

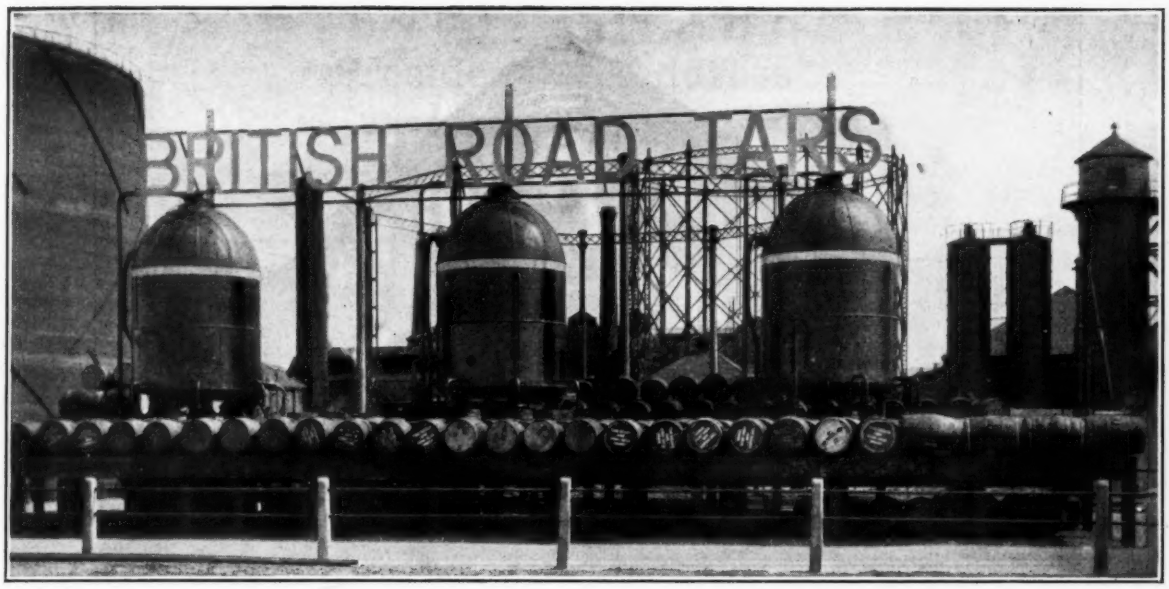
The Fire Station next to the stores contains a very complete set of appliances and chemical extinguishers; smoke helmets, and safety slings are always available for emergencies. The Works Fire Brigade consists of captain and ten men, with a further reserve of eight.

The Works Surgery, erected by the Directors as a Memorial to the men of the Company who fell in the war, has proved to be of the greatest value. A record was made in 1927, when over 4000 dressings were carried out by the surgical dresser who is permanently on duty there, and who also acts as welfare and sanitary officer, under the direction of the Company's Medical Officer.

The test room adjoining the main meter house and engine room is a building with cavity wall and tropical roof to facilitate constant temperature conditions. One half, completely separated from the other, contains the recording and other instruments for the Official Tester, while in the other portion are calorimeters, both recording and indicating, CO_2 recorder,



REINFORCED CONCRETE COKE STORAGE AND SCREENING PLANT. ERECTED 1928.



BARREL STAGE—TAR WORKS. ERECTED 1930.

and recording thermometers and hygrometer for the use of the operating engineers and foremen. A feature of particular interest is the thermostatic control of internal atmospheric temperature, while all instruments are under observation from outside the building, entry to which is restricted to the chemist responsible for the maintenance and calibration of the instruments.

A new Thomas recording calorimeter has been installed with distant signals in the retort houses and laboratory, showing various coloured lamps indicating whether the calorific power is correct, high, or low.

The main meter house and engine room follow standard practice in general, though the "Arca" vacuum regulator is of recent installation. One of the hydraulic power pumps with its accumulator is in the annexe to the main engine room.

The blacksmith's shop contains punching and shearing machine, steam hammer, radial drill, and "Quasi-Arc" portable welding plant, in addition to the standard equipment; and a competent welder is employed full time. In addition to electric welding, oxy-acetylene and oxy-coal gas cutting are carried out.

The fitting shop is well equipped with standard machine tools and has a 2-ton Morris overhead travelling crane for handling of work. Fitters' benches occupy the west side, while foremen's office and tool room are situated at the north end, with lavatory and cloak room extending from the south-east corner.

Stables with cart shed opposite, joiner's shop, and paint shop extend along the east boundary of the works to the sulphate of ammonia plant, which has a capacity of 6 tons of sulphate per 24 hours. The refining plant has several novel features, and was made by the works staff to the design of the Engineer. Air, heated by exhaust steam, passes through the sulphate as it is worked through the rotary drier and helical steam jacketted elevator, and assists the production of crystals free from lumps or nodules. At the head of the elevator, the sulphate passes over a screen before being bagged and weighed. The demand experienced for "British" sulphate is an indication of the quality produced.

The works incinerator is built on to the disused boiler chimney at this plant. The tar works is situated beyond the water gas relief holder and No. 4 spiral-guided four-lift mixed gas holder (capacity 894,000 c.ft.). Tar and liquor from the coal gas plant is passed through a baffle separator on the lines of that designed by the Fuel Research Board, situated in the front entrance yard, where also are the underground storage wells. Settling tanks adjoining the stores further assist separation from liquor; and from there the tar is pumped through a Wikner continuous steam dehydrator suspended in the end bay of the tar works still house. This dehydrator removes liquor and also a large quantity of ammonium chloride which comes down as a solid due to concentration.

The dehydrated tar, with a temperature of 140° C., is run off continuously at the rate of 2 tons per hour into steam coiled storage tanks, whence it is pumped each morning to charge the intermittent system of preheaters and stills. Crude naphtha, light oil, creosote, and pitch are produced, in addition to road tar and bitumen-loaded tars of varying viscosities and qualities.

For road work, the refined tars are pumped over to the road transport storage stills erected with the barrelling stage to the north side of the pitch floor. Deliveries of products by rail are dealt with on the pitch floor siding. Water gas oil tar is dehydrated in two No. 6 Sharples super-centrifuges, which have a bowl speed of 17,000 r.p.m.

The sports grounds adjoin this field, cricket, bowling, and football, both Rugby and Association, are provided for, and the Company's name is much respected in the District Associations governing these various branches of sport.

Nos. 5 and 6 Holders lie south of the dyke, and have capacities of 2,105,000 and 3,553,000 c.ft. respectively.

The booster house lies close to the valves of No. 5 Holder and contains the following plant: Duplicate sets gas-engine driven rotary boosters by the Bryan Donkin Company, Ltd., capacity 50,000 c.ft. per hour, deliver gas through a 10-in. main at initial pressure of maximum 2½ lbs. per sq. in. to a point of admission into the low-pressure mains system between 3 and 4 miles south-west from the works in the district. There is a single De Laval turbine-driven Keith-Blackman centrifugal booster, capacity 750,000 c.ft. per hour against an outlet pressure of 16 in. W.G. This booster delivers gas from Nos. 5 and 6 Holders into the common inlet to governors; No. 4 Holder, throwing 6, 8, 10, and 14 in. according to lift, is also open to the common inlet to governors, and acts as a balancer. The valve is operated by a reversing steam engine with automatic stop gear.

No. 2 Meter House is across the railway south of the booster house, and contains, in addition to No. 2 Retort House gas meter, two air meters filled with gas oil which register the air, heated by exhaust steam to suitable temperatures, for admission to purifiers for revivification *in situ*.

On the right follow D section (No. 2 Retort House) purifiers complete with catch boxes, while A and B sections (No. 3 Retort House) purifiers are contained in a brick purifying house left of the road. In this is ample accommodation for mixing, breaking, and revivifying oxide, and two disintegrators are in use, both portable—one by Crone & Taylor and the other by the Coleman Foundry Company.

The water gas plant is supplied by coke, brought from the retort houses in railway wagons, by a counter-balanced skip hoist of a capacity of 15 tons per hour, delivery at a height of 67 ft. over cascade screens into the feeding hopper to a shuttle-belt conveyor which distributes coke to the storage hoppers. These have a total capacity of 80 tons and are lined with ¾-in. armoured glass on the inclined lower sections. A feeding chute is fitted opposite to each generator.

The generator house contains four sets as follows: No. 1 hand-operated carburetted water gas set by Humphreys & Glasgow; capacity 750,000 c.ft. per 24 hours. No. 2 duplicate of No. 1. No. 3 hand-operated carburetted water gas set by Humphreys & Glasgow; capacity 1,000,000 c.ft. per 24 hours. No. 4 self-clinkering carburetted water gas set by Humphreys & Glasgow, complete with waste-heat boiler and back-run connections, also hydraulic charging; capacity 1,500,000 c.ft. per 24 hours.

The engine room adjoining the generator house contains water gas exhausters and blast fans, one of which is electrically driven. On the west side of the generator house is the filtrator water softening plant for treatment of feed water to the waste-heat boiler. The exhaust steam from the turbines is condensed in two tubular condensers outside the engine room.

In addition to the two Lancashire boilers for general works

EXTENSION OF SHOWROOMS, PROSPECT STREET, HULL.

purposes, the central (Babcock & Wilcox) boiler is situated in the water gas block. This has a capacity of 23,000 lbs. of steam per hour from and at 212° F.

The electric generating house is directly opposite, and contains one 130-KW. generator at 440 volts D.C., driven by a 3-cylinder vertical "National" gas engine; and one 44·5-KW. generator at 440 volts D.C. driven by a horizontal twin "National" gas engine. The main switchboard distributes to sub-switch boards and points of use over the works.

South of the water gas plant are the "Permutit" water softeners for boiler feed; capacity 4000 gallons per hour.

The workmen's changing rooms, baths, &c., and the mess rooms have accommodation for about 350.

In the south-west corner of the works are No. 4 Retort House of horizontals (21 in. by 16 in. section by 20 ft. long, with Fiddes-Aldridge stoking machine, capacity 1,225,000 c.ft. per 24 hours) and No. 3 Retort House of Woodall-Duckham vertical retorts. This is ranged in two benches of 24 retorts each, four retorts per bed. The nominal throughput per retort is 5 tons per 24 hours, and the output of gas from the house 4 million c.ft. per 24 hours.

Coal is elevated by Babcock & Wilcox gravity-bucket elevators from the receiving hoppers and breakers in the coal stores on either side of the retort house; a tray conveyor over either bench distributes the coal to the hopper system. Coke removal is by telpherage. A waste-heat boiler installation by Spencer-Bonecourt to the designs of the Hull Station Engineer is at the end of the retort house.

Well-equipped laboratories have been built on the west face of the office block.

The Company's offices in Hull are situated in Baker Street, while the Distribution Department continues through to Wright Street, having a transport entrance here.

Extensive and commodious meter repair and testing shops occupy two floors, while stores and cooker cleaning and repair shops are situated on the other side of the courtyard. There is accommodation in addition for main and service layers, fitters, lamplighters, and other necessary personnel of the Distribution Department.

The showrooms, situated well in the shopping centre of the City at the corner of Prospect Street and Story Street, were designed by Mr. P. Morley Horder, F.R.I.B.A., of London.

ENTRANCE HALL, SHOWROOMS.

Presidential Address

Of Mr. HENRY WOODALL, J.P., M.Inst.C.E.,

Chairman of the British Gas Light Company.

I have the honour to-day to address you at your 19th Conference. Some of your Presidents served you with a becoming loyalty for more than one year, and I find I am the 16th President of the Association. No Presidential Addresses were delivered during the dark and harassing days of the war, when the Conferences were suspended, but you have had, in all, important addresses on 13 occasions. I have read them all with pleasure and profit. The last two—by Mr. Procter, of York, and Mr. Frank Jones—are admirable reading. Mr. Procter in charming language described the beauties of his historic city. My friend Mr. Frank Jones was able to dilate in a delightful way on the attractions of Eastbourne and our good fortune in being honoured by a visit from their Royal Highnesses the Duke and Duchess of York.

I have not such opportunities. But I must say I think the historic city of Hull is much maligned. Unkind things have been said, as to suitability for residence, of places beginning with "H," Hull being included. Those of you who have time to see the old town and the docks and magnificent river will be rewarded, and if you are able also to see the fine avenues of the modern town you will realize that Kingston-upon-Hull is no mean city. And it is, as you know, the third port in the kingdom.

The first Presidential Address was delivered by my father, to whom I naturally owe my presence here, and I am proud of following—though hesitatingly—in his footsteps. I realize on reading his Address how wise he was in his support of this important Association and how fully he understood the necessity of the work it had to do, and I am sure he would be satisfied that the Association he helped to originate has accomplished so much for the benefit of our great national industry.

In my father's Address he refers to many things and incidentally mentions three names—those of Mrs. Cloudesley Brereton, whom he describes as "our accomplished Editor," Sir Francis (then Mr.) Goodenough, the energetic Chairman, and Mr. Creasey, who fought the prejudices of the London doctors inch by inch. Though our first President is no longer with us, those he singled out have since 1912 proved themselves invaluable, and we are grateful for the cumulative effect of their work and happy to think that from all three we may reasonably expect a further long period of useful service. It is interesting to note that this year we again have a paper from Mr. Creasey.

In 1912 we were the guests of the Corporation of Manchester; on this occasion we are the guests of another important corporation, and we give our cordial thanks to the Lord Mayor and the Corporation of Hull for doing so much to make our Conference a success.

Progress of the Industry.

I propose to begin my short address by quoting a few figures with regard to the progress of a gas company I have known well for some 40 years and with which I have been very closely connected for the last 20 years. I will not give the name as the figures would apply equally to many others:

> In 1890 the gas sold by the undertaking was 300 million c.ft. To-day it is 3600 million, or 12 times as much.
>
> The capital per million sold was £595. To-day it is £462.
>
> The price of gas is higher by only 14 p.ct., though the price of our raw material, coal, is 54 p.ct. higher and the cost of living is up by about 75 p.ct.
>
> Owing to the introduction of the Welsbach burner in 1893, the consumer now gets ten times the light he did formerly from the same consumption of gas.
>
> It was not till 1893 that the company started prepayment installations and provided a boiling ring and four lighting points. At the end of that year there were 68 consumers; now in the company's area there are 72,000 prepayment installations.
>
> The modern gas fire has been greatly improved, and I should probably be right in saying that in 1930 the gas fire and gas cooker are twice as efficient as in 1890.

I give you these figures to show that in spite of the fact that the consumer now gets about ten times the value from the gas he uses for lighting purposes, and double the value from gas used for cooking and heating, that he did 40 years ago, the company is selling twelve times as much gas as in the earlier period.

Steady improvements for many years have been made in carbonizing plant and in the apparatus supplied to customers. We shall probably be in agreement as to the good service we obtain from those who supply our material and appliances. At our first Conference a paper was read by Mr. Yates, the capable Chairman of Radiation, Ltd. When we remember the early gas cookers and fires and then see the present-day product we realize what enormous strides have been made and we do not grudge the prosperity which has come to these enterprising manufacturers. They in their turn no doubt appreciate the advance made by the manufacturers of the gas in supplying a product of regular quality and pressure.

This, I think, proves that the gas engineer, the gas chemist, and the makers of gas apparatus have all been giving good honest service to the consumer, with the result that he, the consumer, is getting much more for his money than in the past, and in consequence in spite of very severe competition the industry has never been on a sounder basis.

I suggest that boards of directors too have had something to do with all this improvement and prosperity. The Gas Industry has an excellent Technical Press, but I should like to enter a mild protest against the rather severe criticism of the management of the industry recently prominent in one Trade Journal. Criticism is good for us, but there should be limits, and it should only be made with full knowledge. A very great deal is being done in all branches of research, the utilization of gas for industrial purposes, &c., and it would appear better that this should be emphasized rather than that the management and conduct of the industry should be belittled. The story of the industry is one of constant progress which I am sure could not have been attained if boards of directors were incompetent and failed to uphold their officials. I am confident that in the vast majority of cases directors encourage and stimulate rather than discourage and thwart them.

Complaint has been made as to the age of directors of companies. We all recognize that experience is needed as well as imagination and enthusiasm. But may I be allowed to mention that at the beginning of this month I spent a few days with, I believe, the oldest living gas Engineer and Director—my uncle, Mr. Henry Woodall. He is now 92 and is Chairman of one of the best managed gas companies in the kingdom; he is not Chairman in name only, and no one even now could with impunity cross swords with him on any matter connected with the Gas Industry. I am proud, as also are many of you, to have worked with him, and we recognize that age cannot wither nor custom stale his infinite variety.

A Sheltered Industry?

We are in a sense a sheltered industry, and I have not infrequently heard it said that in consequence we have too high a standard with regard to wages and consideration generally for the welfare and comfort of our workpeople. My answer to this is that there is no expenditure we make which is more productive than that spent on the improvement of the conditions of our workpeople, and I would especially commend the provision of pensions. As you know, the bulk of our men work for us all their lives, and it is not unreasonable that we should help them to provide for old age. We not only benefit ourselves and the industry thereby, but the nation as well.

To return to the question of being a sheltered industry—it is true that we have a monopoly of our own particular product, but we have to meet very severe and sometimes unfair competition. In the supply of light and heat, both electricity and oil, handled by most capable people, are very serious competitors. We make no complaint as to competition, but we do complain when a local authority uses the money of the ratepayers, of which we are always some of the largest, uneconomically.

A case in point is the provision of electric light in small houses. The very small revenue obtained cannot possibly give an adequate return on the expenditure; and at the same time to take away the lighting and leave to the gas undertaking the heating load only greatly reduces and sometimes eliminates altogether the small profit they, the gas undertakings, are able to make. My complaint would not be so strong if the consumer had any benefit. As a matter of fact he would often prefer gas because of the heat it gives, the better light, and the fact that a mantle is much less expensive to replace than a broken electric lamp. In an undertaking which I have recently taken over I found that in 1124 cottages electricity for lighting had been introduced. It was also found that many were not using it but were using oil and candles. A canvass of the people has resulted in 368 of them reverting to gas to our

mutual content. I may say we are daily recovering more of these lost sheep.

The Grid System.

Another form of expenditure which I should like to see checked is that of the unsightly overhead electric cables. I do not think it has been proved that either electric or gas grids are sound propositions. I know that I cannot show a profit by connecting up small villages. The cost of distribution of both gas and electricity is heavy; and I am convinced that it is better and cheaper in the majority of cases for small isolated communities to generate gas and electricity in their own areas. This does not mean that I deprecate amalgamation; on the contrary, I have seen the very great benefits to small communities from the amalgamation or absorption of their gas undertakings by their larger neighbours. It does not, however, by any means follow that after absorption the smaller should be shut down.

One word also as to public lighting. In these days when everyone is calling out for economy it does seem rather outrageous that all over the country efficient gas lighting in our streets is being displaced, at very great cost, by less efficient electric lighting. This is done where the local authority own only the electrical undertaking. In Birmingham, where the Corporation owns both gas and electrical undertakings, we have just been told that there are sixty-three gas lamps to every one electric. In Tottenham, where the gas and electricity are in the hands of rival companies, 96 p.ct. of the street lighting is done by gas. Lately, in spite of very serious competition, gas was adopted for the lighting of the new arterial roads in the Tottenham area. In other towns with which I have had to deal, such as Norwich and Ipswich, where the local authorities own the electrical supply, gas is being very rapidly wiped out.

Perhaps the best proof that gas is a better road illuminant than electricity is the test recently made at Lewisham where gas and electricity were tried and tested and the South Metropolitan Gas Company were able to show that they could beat electricity for street lighting, and gas was adopted.

Unfair Competition.

We are well aware that electricity has its uses, but those of us who are always dealing with these matters know that there is a strong and ignorant prejudice in favour of electricity. Where one is fighting a company we make no complaints as to competition, but I do hope that before long it will be made very difficult for local authorities to borrow money for the electricity undertakings unless they first prove it will be wisely and economically used.

In a speech delivered by Mr. Arthur Hayday, M.P., at our last Conference—a speech which has been printed by the "B.C.G.A.," and which I am surprised has not been more widely circulated by gas undertakings—he speaks of the great benefit which gas has conferred upon the housewives of the country and gives details of what these comforts mean. He then goes on to say:

> Are all these boons and blessings which gas has brought at very small cost to the worker and his family in his home . . . to be forgotten or overlooked and are the hundred thousand workers engaged in the gas industry and the many thousands employed in ancillary trades to be thrown on the scrap-heap, in order that the same services shall be rendered by electricity—at greater cost, with a huge waste of coal and chemicals and with a smaller amount of labour employed?
>
> . . . As long as the question is fairly decided on technical and economic grounds, well and good, but the scales must no longer be weighted as they ***have*** been to our disadvantage simply because some people think electricity is fashionable and "the coming thing."

The above is so true that I hope you will agree that it bears repetition.

You are aware that legislation is now being considered to bring us more into line with present day requirements. Those whom we have elected to represent us on our various institutions are very much alive to the needs of the Industry. In the past we have had great leaders, good engineers, good administrators, and men of high character. That can also be said of our leaders to-day. I would suggest that those of us who feel that we are suffering under any disadvantages which legislation might alleviate should not fail to advise those who are in authority.

And now, Gentlemen, I want to thank you for the honour you did me in appointing me your President, and for giving me this opportunity of expressing my pride and faith in our industry. Our country is going through a time of great depression and distress, and we have every reason to be grateful that we are able to satisfy our consumers, our workpeople, and our shareholders. Why is this? I think it would not be altogether unfair to claim that part of our success is due to foresight and good service. I do not suggest that we take entire credit for it, nor do I think it would be quite fair to say that we made a virtue of necessity. We remember that, during the war, gas shareholders suffered severely owing to the fact that legislation, which there was no time to amend properly, made it impossible to pay the dividends we earned and that our shareholders were accustomed to receive. The reason why it is not quite fair to say that we made a virtue of necessity is that the legislation by which we are governed was proposed by our old leaders and not by the government of the day. It is generally recognized that gas legislation is a model of what such legislation should be, and the amendments which are now being suggested are only necessary to meet competition which did not formerly exist.

Most of us are happy to think that during the war we, perforce, could not be profiteers. If we look back we shall realize that those who were able to make excessive profits during the war period, and, shortly after, lost their sense of perspective and were rarely wise enough to see the trend of events. The general prosperity of the Industry and the strength of our stocks is to some extent due to the fact that there has never been any opportunity to divide large profits, but that we have always paid the regular dividends to which our shareholders were entitled. The severe competition which for many years we have had to meet has strengthened, rather than weakened, our position. Never before have we devoted so much time to improvement and research or have we had such numbers of highly qualified people engaged in thorough investigation of every detail of our business.

The Work of the "B.C.G.A."

Since its inception the "B.C.G.A." has played its part in bringing us together and in advertising the improvements we are making. We shall agree that with the advent of the "B.C.G.A.," new and better conditions as to advertising and the pooling of our knowledge have been introduced. Attention has also been given to special service and advice as to the best methods of using gas. The success of the Association's work is well illustrated by the fact that in 1912, when it was founded, 252 gas undertakings were members, whereas, in spite of amalgamations, the number to-day is about 850. In fact, measured in output of gas, the membership represents 96 p.ct. of the whole industry.

There are those—but I am sure a small minority—who grumble at our efforts. To the small undertakings the help and advice they are able to obtain through the "B.C.G.A." is admittedly invaluable. Occasionally, however, some of the larger undertakings suggest that they could themselves spend their subscriptions with greater effect in their own districts. I by no means agree. I think they must realize the importance to the whole Industry of co-operation between the larger and the smaller undertakings if the smaller are to be kept up-to-date. Most of us know people—whom we still call our friends—who have nothing but abuse for gas, and I find frequently that these have formed their ideas because of inefficient service received from a company of limited resources. These justifiable grumbles do more harm to our Industry than some are prepared to recognize. Most of us who supply gas to small towns and villages remote from the coalfields are conscious of the high price we have necessarily to charge; but where gas of good quality and regular pressure is supplied I find that consumers are willing to pay a price which will allow for adequate return on capital invested, and I am confident that bad service is the cause of friction more often than high price.

Industry and Applied Art.

Now, Gentlemen, I wish to say a word about "B.C.G.A." literature. I ask any of you after going carefully through our publications whether you do not think they are of outstanding merit, completely up-to-date, most artistically produced, and deserving of our thanks and congratulation. What has surprised me is the small use made of some of them.

Recently we have heard a good deal of criticism of tankless gasholders and of the unpleasing appearance generally of our works. There has been an enormous improvement of late years in our buildings, and we have brought in to advise us distinguished architects, to whom we are grateful. There is still something to do, but by judicious design and colouring much ***can*** be done and is ***being*** done to placate public opinion. Personally, having been responsible for the erection of the first waterless gasholder in this country, I have no feeling of any need for apology. We are a conservative people and do not easily accustom ourselves to change, but I have heard many declare—and among them those whose opinions on such subjects are valued—that the new form of construction is more attractive than the old, besides possessing other advantages. Of one thing I am quite sure—that had the first gasholders been of the waterless type there would have been an outcry at the erection of column or spiral-guided holders.

And in this connection I might mention the provision of suitable showrooms. Not only are they, I believe, the best form of advertisement, but they are also a very good form of investment. Progress in this direction also has been encouraged by the "B.C.G.A." It is a pleasure as one travels through the country to see the admirable buildings now being erected by gas undertakings for use as offices and showrooms.

Future Work.

We have been fortunate in our Presidents in the past, and I am quite sure that next year the affairs of the Association will not suffer in the able hands of our new President, Mr. J. E. Daw, of Exeter, who is assured of our most hearty welcome and support.

On occasions like this one feels prompted to thank a great number of people by name for all their help and kindness. But the list is long, for they are many! They will, I know, forgive me if I express my appreciation collectively. I would like to say how conscious I am of what I owe to them for their great consideration.

In conclusion, I think we have every right to be proud of our Association, and in handing over the position, which I am happy to have occupied, I feel that the work of the Association in the future may be even more advantageous to the Industry than in the past. I trust that its continuity of control may go on for many years, though we need to remember that "no life lives for ever" and must train the younger generation to serve this Association, to which I wish all possible prosperity.

Vote of Thanks.

Sir George E. Davies, proposing a vote of thanks to the President, said: Mr. President, I feel I am the one person who ought not to address his remarks to you, because they have very close reference to yourself; but I must say I consider it a privilege on this occasion to be allowed to be the mouthpiece of all those present in moving a hearty vote of thanks to the President for the most interesting address to which we have just listened. At the same time we thank our President not only for his address this morning, but also for the services he has rendered to the Association during the last twelve months. In his Address, the President has reminded us of the progress of our industry, especially during the past 18 or 20 years. The figures he gave us were in themselves impressive; they applied to his own Company, but I am glad to think that the progress he described of his own undertaking is a progress which has been general throughout the industry during that time, and that the remarkable figures of increase of his own Company are reflected in the results of the working of all the well-regulated gas companies in the country. It is during this period of 18 or 20 years that we have had, perhaps, our largest increase; and it is during that period we have had the intense competition of electricity. Thirty years ago electricity was hardly a competitor, but during the last 15 or 20 years it has been growing more and more as a strong competitor; and it says a great deal for our industry—and I hope for the future of it—that during that time we have seen such great developments.

I have no hesitation in thinking that a great deal of this development and a great deal of this success have been due to the work of our Association. I endorse—and I think we will all endorse—what the President has said in connection with its work, that its publicity work has been good. This has been the experience of us all, but I should like to endorse also the suggestion that, excellent as this publicity work has been, it might have been very much more useful—because it might have been a great deal more—if we had been able to devote a larger amount of money to it. I do not quite know how the funds at the disposal of the Executive will pan out, but I can only endorse what the President has said, and hope that we shall get an even larger amount of money at the end of the coming year. Then I want to emphasize the great extent to which the prosperity and success of the industry may be attributed to the work of the B.C.G.A. We have had a great deal of very useful information as to the application of gas in very many industries; this has been most useful to all up-to-date undertakings who are anxious to develop, and the information we have received from headquarters, gathered for the use of all, has, I suggest, been of very great benefit. Another thing which I think we may fairly say has helped us has been the annual gatherings of the Association. They are, and have been, extremely useful. It is pleasing, of course, to meet yearly our friends at luncheon or dinner; but that is only part of it. It is the meeting year by year with men who are interested in the same industry which is in itself a most useful and valuable thing. It brings together our technical officers, our engineers, and our secretaries; and I venture to think that these meetings are also valuable to the chairmen and leaders of the industry in that they are able to rub shoulders with others and hear what other men have to say on problems of common interest. It is useful sometimes for chairmen and directors themselves to have their education improved at meetings of this kind, because it is extremely good for all of us who are responsible for local administration to have all the information we possibly can in regard to what others are doing. I know there are sometimes chairmen and officers and men of all sorts who are taking a keen interest in an industry who are inclined to think they know all there is to know about it. We have all met that class of man; but I do not think there is anybody in the world who knows everything there is to be known about any subject. It is by gatherings of this kind that we can help to make ourselves better and more capable directors of the industry to which we all belong. I hope I have not said too much about the industry, because my particular business is to propose a hearty vote of thanks to our President. It is because Mr. Woodall has been President of the Association during the past year that it has, in my opinion, been doing such fine work; and for that reason we desire to thank him now for the excellent way in which he has helped us. In thanking him we wish him all happiness in his retirement from the office of President.

Mr. Frank West: I have the greatest possible pleasure, as Chairman of the Society of British Gas Industries, in seconding this vote of thanks, so ably presented by the proposer, and every word of which I fully endorse and heartily support. We must remember that, great as our appreciation of and interest in the President's Address is here, it will be read in a much wider field than those present in this room to-day, who will enjoy and appreciate the masterly way in which he has dealt with the many features and developments of the gas industry.

The vote of thanks was accorded with acclamation.

The President: Thank you very much, Sir George Davies and Mr. West, for the way in which you have proposed this vote of thanks, and you, ladies and gentlemen, for the manner in which you have received it. I have enjoyed my year of office. I cannot claim to have done a great deal, but I am quite sure I have learned a great deal; and the more I know about the Association the more I am convinced of the value of the work it is doing. When you become president of an association, you do learn a good deal about the work it is doing; and only those closely associated really know what good work is being done. I thank you very much indeed for your kind vote of thanks.

A Woman Doctor's Views on Gas in Relation to Hygiene

By Dr. ELIZABETH C. MUDIE

"That men, whose very being is aer should not breathe it freely when they may, but condemn themselves to this misery, is strange stupidity. Yet we see them walk and converse in London, haunted by that infernal smoake and the sunless atmosphere that accompanies it."

Gentlemen, we are apt to regard the crusade against air pollution as of recent origin, yet the foregoing words of John Evelyn, the celebrated diarist, who lived in the reign of Charles II., expressed his disgust that "the accursed avarice of the few should be suffered to cause prejudice to the health and felicity of the many."

Health Reforms.

During the past half century legislation has been busy with problems dealing with the health of the people.

The iniquitous window tax was abolished, infectious diseases have been isolated and our hospitals and welfare clinics developed upon most efficient principles. School hygiene is tending more and more towards perfection. Our water supply is second to none throughout the world, and the twin services of drainage and removal of refuse from our houses has reached a satisfactory standard.

Food reforms have been claiming a very large amount of attention, so that definite laws regarding the sale of food have existed since 1875.

Let us, however, be clear as to what is meant by food. The Act says, "*Food shall include every article used for food or drink by man; other than drugs or water.*"

In formulating the above definition it is plain that the most important food of all has been left to take care of itself, that is AIR.

Food, such as is described in the preceding lines, is taken thrice daily. The stomach and other digestive organs have wonderful powers of defence and adaptation, and can normally deal with any minor form of adulteration. Epidemics of actual food poisoning have been rare, and mortality from the same cause negligible. To return to Evelyn, "The body commonly feeds upon meats at stated times, whereas upon the air or what accompanies it—it is always feeding, sleeping, or waking. Therefore the election of this constant food should somewhat concern us. Corrupt air insinuates itself into the vital parts of our body immediately. The defects of our other foodstuffs are to some extent mitigated by cooking. Lucid and noble air subtilizes and clarifies the blood, cheers the spirit, and promotes digestion. Bad air perturbs the body, prohibits necessary transpiration for the dissipation of ill vapours, even to the disturbance of the rational faculties which the purer air illuminates."

Vetruvius, the famous architect and military engineer, who, under Augustus, changed Rome from a town of bricks and mortar to a beautiful city of marble, was obviously well acquainted with the fundamentals of public health since he would only build where the air was pure and wholesome.

Attaining Clean Air.

Under the Smoke Abatement Act, factory chimneys are dealt with, though it is true that this law is not too rigidly enforced. The day must come when it will be considered a penal offence to burn raw coal in any open grate or furnace, and the domestic chimney is the worst offender.

Professor Glaister, of Glasgow University, in his "Manual of Hygiene, 1920," says, "It is largely sentiment which prejudices mankind in favour of coal fires." He also says that it is the most wasteful form of generating heat, since three-fourths of the heat is of no service to the apartment, and a third of the fuel is dissipated in smoke. This smoke passing into the outer air manufactures fogs, which make our existence in cities unbearable.

That the coal fire is the only means of heating our houses consistent with health, is an exploded theory, proved by the carefully recorded experiments of the research laboratories as well as by the growing mass of medical evidence based upon actual experience in the reception and consulting rooms.

Survey of Heating Methods.

Taking a rough survey of the different methods of heating in order of popularity comes first the romantic coal fire, romantic to all except the housewife responsible for removing the dirt and dust it entails. This method is extravagant, inefficient, and very untidy. Its gravest fault, however, is that it has been proved to be responsible for the growing increase of respiratory diseases, from the common cold to pneumonias. Infant and maternal mortality problems might be solved by the abolition of smoke and in all probability the declining birth rate would cease to be so marked. Mothers, for whom housework has been degraded into drudgery by the work of her own and her neighbours' coal fires, will naturally hesitate to add to their burdens by having more babies. To see tiny infants fighting for life with broncho-pneumonia is an experience calculated to rouse a feeling of positive loathing for the so-called romantic coal fire.

Other forms of heat are by closed stoves standing out in the room, and by central heating; the first is economical and clean, but, owing to the escape of carbon monoxide which must issue from the cracks when the stove is hot, its use cannot be recommended. Central heating is obviously unsuited for the modest dwelling. Both these systems, however, have two common defects. They heat the air and not the objects in a room, and being without good ventilation there are no air currents. We all know the effects of going into a room filled with warm dead air.

Electricity has some of the same drawbacks as the two methods just mentioned, and in churches and other public buildings lighted with electricity there must be special provision made for ventilation, since the motive power of an illuminant such as gas is lacking. Coal gas is therefore employed as a sunlight burner at the mouth of a ventilator situated on the roof ridge. Thus it can be seen that gas is really indispensable even where electric light is installed upon a large scale.

The gas fire now comes under consideration as a method of heating the home. Let us first take the disadvantages of this mode of heating, they are not many and may be disposed of quickly. (1) Gas uses up a considerable amount of oxygen. (2) Gas fires can be extravagant if not watched. (3) Gas fires, if improperly fitted in unscientifically built fireplaces, can be very unhealthy.

The first of these objections is not an objection since the gas fire uses up the oxygen of the air which goes up the chimney, and not of the air which is continually being drawn into the room to replace it.

The second is a matter of ordinary carefulness—never leave the gas fire on when not actually needed. Gas fires will heat a room to the required temperature in a few minutes, which is more than can be said for the ordinary coal fire.

The third disadvantage would apply also to any other form of heating. Try putting a coal fire outside the range of a vent, and you would not only get worse fumes than with gas, but smoke and soot as well.

Advantages of Gas Fires.

The fact that gas fires in a household will reduce a domestic staff from two servants to one is common knowledge. A clear saving of at least £70 a year is effected. However, the greatest of all the advantages of the gas fire over other methods of heating is that it is rapidly approaching the character as well as the function of the sun. We have now been able to capture the infra-red rays of the invisible spectrum. These rays have the power to penetrate the skin and carry the life-giving properties to the blood vessels themselves. It is only a question of time before we shall eventually reach the other end of the spectrum and be able to use the ultra violet rays. This indeed will be a blessing to have sunshine all the year round "on tap."

When asked by my patients or friends whether gas fires are healthy, my reply is "I have five of them in my own house," and in my student days my tiny flat was heated by a "Sunbeam" fire over which I sat often for several hours at a time working for exams, and I never had a headache.

Costs are not so much my concern as are the other sides of the question. Nevertheless, I am going out of my province as a doctor to tell you of my experience as a housewife and a consumer. During student days, for lighting, heating, cooking, and ironing, in a small flat of three rooms, kitchenette, and bathroom, my bills never exceeded the sum of 4s. weekly, even when gas was at a high rate. I could not have heated and cooked with less than two hundredweight of coal, this would have cost four to five shillings and there would still have been the lighting account, a very considerable item with students. What was saved in cleaning and washing cannot be accurately gauged.

Most of this paper has been concentrated upon the question of heat, as this is the most important factor in our lives. The fact that I have used a gas cooker and seen it used in my home all my life, shows my opinion of it as an efficient and healthy means of cooking. As for lighting, though we have come to regard electric lighting as the ideal, there is still a great deal of work to be done before the glare, which is one of the objections of electricity, is sufficiently overcome. Gas will give a soft light when shaded with a bowl, and it also has the advantage

of giving out heat. A bowl fixture in my house at Skelmorlie, when lighted, will raise the temperature about 8° F., and this often enables me to do without a fire when the weather is not too cold.

Smoke abatement should be the ideal of every citizen who has the welfare of the city at heart. His slogan like that of the Sunlight League should be "Clean the Skies." The members of the gas industry must do their share, both in the matter of research and costs, to bring about this ideal. The words of Shelley in "The Revolt of Islam" come to my mind as I am concluding this paper and seem as though they might have been written for this purpose.

"Avenging poisons shall have ceased
To feed disease with fear and madness
Our toil from thought all glorious forms shall cull
To make this earth our home more beautiful
And Science with her sister Poesy
Shall clothe in light the fields and cities of the free."

VOTE OF THANKS.

The PRESIDENT: I am sure we are all very grateful indeed to Dr. Mudie for her paper. She is a most enthusiastic advocate of gas. There will be no discussion upon this paper, and I will ask Mr. Shapley to propose a vote of thanks.

Mr. C. S. SHAPLEY: We have listened this morning to a very interesting paper; and I think it was a happy idea on the part of the Executive to ask a lady doctor to give her views about the consumption of gas and its connection with the health of the community. It is very nice to hear the views of the opposite sex, because, after all is said and done, it is the ladies who use the gas in the home. It is not the male population which is responsible for the consumption of gas; and when we hear first hand from a lady doctor about the virtues of gas, I think we can congratulate ourselves, and also congratulate her, on the very effective way in which she has dealt with the subject. I agree with practically everything Dr. Mudie has said, particularly in regard to central heating. In my opinion central heating is an abomination. I have it in my own house and I have also electric light. I have only been in my present house for about three months, and it is the first time I have lived in a house with electricity. Already my wife is beginning to feel that she will have to wear glasses, so that there is something in gas lighting from the eyesight point of view. With regard to central heating, I find the atmosphere is very dry. There are no air currents; and we should urge consideration of this point upon our local authorities before they pass plans for new buildings. Only recently the City of Leeds embarked on a £1,000,000 street; and the first block of offices to be put up to the designs of an architect who is a personal friend of mine did not contain a single flue. A flue is absolutely necessary in every room and in every office; and anybody who considers central heating without a flue is badly advised. I have the greatest pleasure in proposing a cordial vote of thanks to Dr. Mudie for her paper.

Mr. H. M. THORNTON: I think we are more than grateful to the author for giving this paper, for two reasons—first because of the scientific and medical point of view, and secondly because the paper has been based upon practical everyday experience. And this, after all, is more important than the scientific or medical point of view. The author is in excellent company in regard to the medical profession, because she is not by any means the only one, as a doctor, who can sincerely recommend gas apparatus for domestic and other purposes. It is very important to the industry to feel that we have a lady doctor who can speak to us as Dr. Mudie has spoken to us to-day, and can give us such helpful thoughts and ideas on gas for all purposes. I was particularly delighted with the paper myself because of its reference to gas-fire heating; and here I do not wish to dwell except to say that I feel that the industry has much to do with regard to the development of gas-fire heating. It has been a subject very close to my heart, not from the manufacturing point of view only. I feel that we have in other forms of heating acute competition; and this competition is not standing still. The gas fire has much to recommend it. Gas is much superior in every way to all other fuels; and it is up to us, as an industry, to lay greater stress on all the advantages which the gas fire presents. The reference Dr. Mudie made to the radiants of the gas fire is very important, but we must not exaggerate that side unduly. Much has to be done in research work yet to arrive at the ideal. We have men like Sir Leonard Hill, and others of almost equal eminence, who have pressed forward the claims of gas; but there is still research work to be done. Another thing which Dr. Mudie mentioned only briefly was the ventilation afforded by the gas fire when it is properly fixed. Here we have a great weapon against the enemy. I say "the enemy" in no unpleasant way, but I do feel we cannot afford to stand still on this very important subject. I have much pleasure in seconding the vote of thanks to Dr. Mudie for her paper.

Sir FRANCIS GOODENOUGH: I am very pleased to have an opportunity of adding my thanks to those of the mover and seconder of this vote of thanks to Dr. Mudie for coming here to-day and giving us this paper, because I was responsible for the invitation to Dr. Mudie. I went to a Conference in Ayr earlier in the year, and was very much interested to hear Dr. Mudie's enthusiasm, as a woman doctor, for gas. I felt that her influence would be of real value to the industry; and I feel sure that you will agree with me. We cannot do too much to make known to the public that the medical profession as a whole are great believers in the hygienic value of the gas fire. Since Mr. Creasey read his paper at Manchester—when our President's father was in the chair—on the subject of the medical profession, we in London have fixed thousands of gas fires for the medical profession, until it is more true than ever to-day that the use of gas per acre in any residential district is higher in the Harley Street district, which is occupied, as you all know, very largely by the leading specialists in both medicine and surgery. This is a very powerful weapon in our armoury, and one of which we should make the fullest possible use; and I thank Dr. Mudie very much for coming here to-day and telling us, as a woman doctor, what other doctors of the other sex have told us before—that the gas fire is the most hygienic form of heating, being the very best imitation of the sun that can be found in artificial heating. I therefore have the greatest pleasure in supporting the vote of thanks.

The vote of thanks was put to the meeting and carried with acclamation.

Dr. MUDIE: It has been a very great pleasure to me to come here to-day. If I have carried a message to your hearths and homes, I think my time has been very well spent. I should like to give you a little thing to think about regarding the vexed question of ventilation. The reason why the gas fire has been so badly treated, and has lost a good deal of its reputation, is because it has been fitted in places where there were no flues. Just at the moment when Mr. Shapley was speaking of flues, it occurred to me that a good slogan would be "Flues abolish 'flu." [Applause.]

Service to the Consumer

By Mr. HAROLD E. COPP, M.Inst.C.E.,

President of the Institution of Gas Engineers (Engineer and Manager, British Gas Light Company, Ltd., Hull).

Definition of Service.

The subject of my paper to-day is such a hackneyed one that there seems to be very little remaining to be said about it which has not already been said by distinguished members of this Association; indeed, only at your last Annual Conference a very excellent paper was submitted to you under precisely the same title. My only hope, therefore, is that in approaching the subject I may succeed in doing so from a slightly different angle, and, although you may not all be in agreement with my points of view, I hope that the discussion may bring out some expressions of opinion and experience which will be of value.

In the first place, the term "Service" as applied to commercial activities is one which may easily be misunderstood. It is, I imagine, an imported one, and is much misused in that it is indiscriminately employed by nearly everyone who has anything to sell. Primarily, it implies that the purchaser of any commodity is to receive something for nothing, which is, of course, not only giving rise to a misapprehension, but if true, is, *ipso facto,* bad business.

If a person is selling boots or pianos he naturally sees further business in repairing the former or tuning the latter, but if he sells sugar that is possibly the end of it as far as further business is concerned, assuming, of course, that he does not mix sand with it, in which case he can hardly hope for business in other directions.

The gas industry, however, is not quite analogous in either case, and we may well claim to be free from any suspicion of hypocrisy in the use of the term. In the first instance we sell a commodity—namely, gas—of a definite heating value at a definite price; secondly, we sell certain apparatus whereby that gas may be used to the best advantage by the purchaser, and we are continually striving to supply the consumer of gas with such apparatus and to maintain it in such a state of efficiency that it will give him the greatest satisfaction. That, I submit, is "Service to the Consumer" in the best sense of the term. Why do we do it? Well, just because we have the commercial acumen to realize that a satisfied consumer is likely to use more gas, not only for his present purposes, but for other purposes to a greater extent to the mutual advantage of both the consumer and the supplier. Strictly speaking, "Service" to the consumer does not convey the exact meaning of my subject. To use gas to the best advantage the consumer must have the assistance and advice of persons with technical knowledge on the subjects of heating, ventilation, and lighting, all of which imply certain obligations on the part of the gas supplier. I would, therefore, prefer that the title of this paper were "Duties and Obligations to the Consumer."

I may be departing from the accepted sense of the title of this paper, but I wish to place the widest interpretation upon my subject in the belief that by so doing I shall serve the greatest interests.

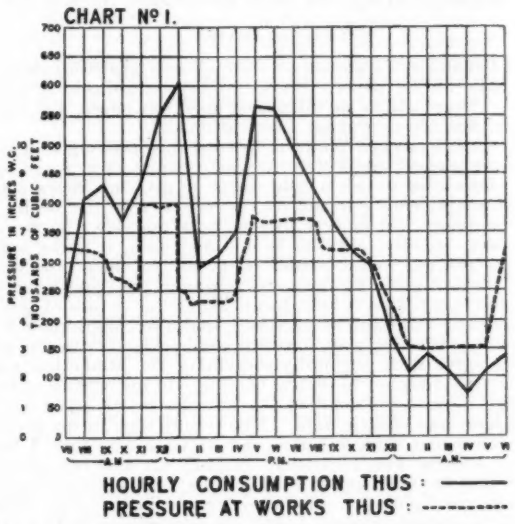
The greatest service we can render to the consumer is that of supplying cheap gas. This can only be done by a wise selection of plant, and by the most careful supervision of such plant and of every phase and process involved in making the gas. In my opinion, "Service to the Consumer," as is the case with most of the activities connected with the gas industry, originates in the retort house. Coals should be blended as is practically possible to produce gas of a uniform composition. Heats should be carefully controlled to the same end. The calorific value of the gas should not vary beyond 1½ p.ct. limits, and great care should also be taken to see that its density should not vary beyond narrow limits. Although the former may be fairly constant, any considerable alteration in the percentage of carburetted water gas would so affect the specific gravity as to interfere with the efficient use of consumers' appliances. But what is of still greater importance—the pressures of gas in every district should be maintained with a minimum variation so that consumers' apparatus should always be supplied at the pressure at which it has been adjusted to give the most satisfactory service. In order to do this in districts where the mains are used to an extent approaching their capacity, the pressures at the works, should, as far as possible, be adjusted to coincide with the hourly rates of consumption. I would refer you to Chart No. 1.

I would here emphasize the importance of cultivating the present keen competitive markets for our ancillary products. I do not like the terms "bye-products" or "residual products." We must see to it that our great public is supplied with clean, graded, smokeless fuel in the form of coke to suit their various requirements. We must carefully supervise the distillation of our tar and tar products to conform to our customers' requirements, and although the production of sulphate of ammonia is no longer a paying proposition and ammonia production is at present in excess of the world's requirements, we should seek to discover some other outlet for this product.

These questions are vital, inasmuch as our ability to sell cheap gas is directly dependent upon them.

Costs and Comparisons.

It is no part of our policy to say or do anything derogatory to the interests of our competitor, electricity; we have quite enough to do in bringing before the public the advantages of using gas for the purposes for which we recommend it, and we may justly say that as an industry we do not claim any advantages over our competitor which cannot be amply justified.



This chart shows the hourly rates of consumption, and the corresponding pressure maintained at the works on a typical winter's day at the Hull Station of the British Gas Light Company.

The price of gas and particulars of discounts at the Hull Station of the British Gas Light Company, Ltd., are as follows:

For ordinary purposes gas is 7d. per therm. Discounts on this charge are allowed for both ordinary and industrial purposes according to the following scale:

Consumption per Quarter.	Discount.
62,500 to 125,000 c.ft.	5 p.ct.
125,000 to 250,000 ,,	10 ,,
250,000 c.ft. and over	12½ ,,

As far as gas undertakings are concerned, the terms "Service" and "Salesmanship" are almost synonymous. The latter, again in an imported sense, implies the art of selling an article to a more or less unwilling purchaser. That, I maintain, should be the last thing that we as gas distributors should attempt to do. The gas salesman should be a person thoroughly conversant with the capabilities and performance of the articles he sells, and the specific purposes for which they are offered to the public. He should possess a complete knowledge of the practical value of heating and lighting by gas, and also by electricity, not for the purpose of disparaging the latter, but rather for enabling him to place the merits of each in their true perspective before the customer.

Notwithstanding the fact that in America electricity is more extensively used for lighting than in this country, they have learnt to use gas to a larger extent than we have for heating and industrial purposes. The greater future for the use of gas in this country lies in the development of the latter, and for the attainment of that ideal we require salesmen with a sound knowledge of chemistry, physics, and mechanics. It must be the duty of gas undertakings in this country to take upon themselves the obligation of training such men even at their own expense. The failure to secure such large gas consumptions in this country is largely due to inefficient uses of such apparatus as we have available at present, and the fact that most gas undertakings have not on their staff men possessing the necessary knowledge to demonstrate to manufacturers the multifarious uses to which gas may be applied to their advantage. Consequently, many manufacturers are using other fuels, such as oil and anthracite, when they should be using gas. Adaptability to a changing environment is absolutely essential

to survival, and here I would emphasize that contemporary evidence from other countries, where electricity is more universally used than in this country, indicates that the use of gas would appear likely not only to be maintained but to be greatly increased.

During the past ten years, conditions of life and the outlook on life of the people of this country have undergone a fundamental change. Bureaucracy has developed to an alarming degree, and people have begun to look to some authority, whether governmental or municipal, for all the requirements of life. This has given rise to the creation of armies of inspectors and officials. Gas undertakings should, therefore, strive to render service to their consumers in the most quiet and unobtrusive manner. If a consumer wishes to purchase any gas apparatus, the number of forms to be signed and the number of workmen or inspectors who call at his house in connection with the transaction should be reduced to a minimum. It must be remembered that the psychology of the public varies in different parts of the country, and that services such as we may render will be welcomed in some districts and resented in others.

System of Maintenance.

We have had an organized system in existence since 1910, and our men are instructed to render every possible service to the consumer in as unobtrusive a manner as possible, and to be courteous on all occasions, first consulting the consumer to obtain his consent to enter the premises. Apart from this organized scheme, and that of the maintenance of burners (on which women only are employed) every workman in the Distribution Department has now become, to a large extent, a maintenance man, inasmuch as a request from a consumer to call and repair (say) a cooker tap, does not often end in his card being marked "tap repaired," as he is instructed to make a courteous inquiry for permission to examine and adjust, if necessary, any other gas apparatus on the premises. A list of such appliances is now being made, so that in due time it is hoped to compile a complete inventory; those which are found unsuitable are in most cases replaced. In this manner water-slide pendants have been eliminated, and very few cork slide pendants remain in the district.

In order to retain cheap and efficient gas lighting in the houses of the working class, some years ago the Directors of the Company, with characteristic enterprise, decided to fix, free of charge, a "British" inverted burner with suitable pendant in the house of every prepayment consumer. As a result, much gas lighting has been retained which would otherwise have been lost. No fewer than 44,000 fittings have been thus supplied. Alas! in many of the new houses built and owned by the municipal authority, the use of gas is prohibited for lighting, the reason given for such action being that the rooms were too small and the ceilings were too low for gas lighting. The real reason, however, is not far to seek.

I submit that for efficient "service" every gas consuming appliance of whatever character should be periodically examined, so that it may be kept in the highest state of efficiency. Yet I believe that with the exception of a very few undertakings only the fringe of the subject has been touched, and very much remains to be accomplished before we can be reasonably certain that gas consumers themselves are not only satisfied with, but use with pleasure, the appliances they have had installed. I am aware that most undertakings are doing something in this direction, and I certainly do not claim that we are doing more in Hull than in other cities; indeed, although in principle I do not believe in spoon feeding, I am convinced that in the face of such competition as we have to meet, much more extensive service must be undertaken in the future.

As far as the Hull Station is concerned, we have six high-grade fitters exclusively engaged on the inspection of consumers' apparatus. Last year they visited 8976 premises and inspected and overhauled 12,942 appliances.

Labour costs	£986	17s. 0d.
Average cost per visit		2s. 2·38d.
Average cost per appliance		1s. 6·30d.
Average hours per visit	1·47	
Average number of appliances per house	1·44	

The apparatus consisted of—

Gas fires	11,286
Geysers	315
Coppers, radiators, &c.	1,341

This amount of maintenance work, therefore, seems to be sadly inadequate, but the systems, having been evolved, are being developed as quickly as possible. I may say here, however, that I am somewhat alarmed at the ever mounting costs of the distribution of gas in relation to those of manufacture. Some limit must ultimately be set, or we may defeat our own objects, the chief of which must be cheap gas.

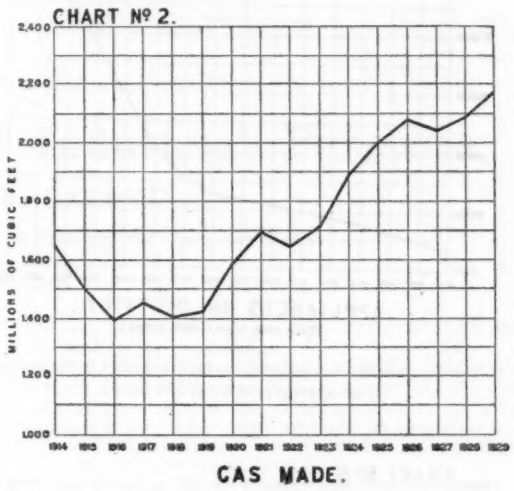
We had in our district at the end of December, 1929:

Ordinary consumers	19,986
Prepayment consumers	37,361
Cookers	33,961
Fires, radiators, &c.	25,526
Coppers	11,475

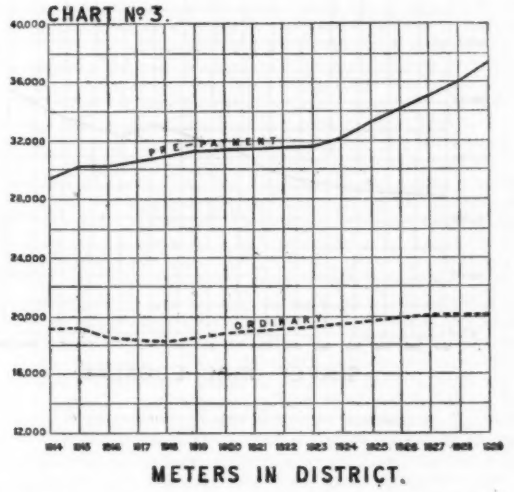
At the Hull Royal Infirmary, in addition to the kitchen cooking equipment, there are 45 gas fires, 9 sterilizers, 6 B.T.U. boilers for the supply of hot water, and 6 cookers in the nurses' duty rooms.

I may mention that we have a working arrangement with the local Master Plumbers' Association whereby special discounts are allowed for business introduced by their members, which enables them to offer free fixing terms to their customers. While they do not do a very large business in gas appliances, they certainly do not hinder our business.

All canvassers, fitters, and inspectors, are furnished with printed leaflets setting out the costs of gas for various purposes, the details of the various complicated methods of charging for electric current, and the relative cost of gas; furthermore, all the figures given have been properly authenticated, so that up to now they have not been disputed.



Showing steady progress made at Hull in output of gas.



Showing increase of both prepayment and ordinary meters in Hull area of supply.

Expansion and Progress.

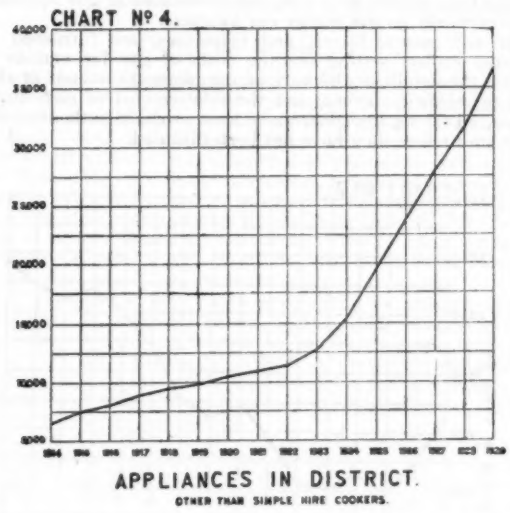
Charts 2, 3, 4, 5, and 6 clearly indicate the continual progress of the undertaking since 1919, so that no further explanation is necessary, but I think that the services rendered to the public, although involving greatly increased maintenance work, amply justify the Company's progressive policy.

In the appendices will be found very brief particulars of the systems in use in our Distribution Department, which, while much simpler than those employed by many gas undertakings, we find to be perfectly effective. Full particulars and other literature issued by the Company will be gladly furnished to any member who may be interested.

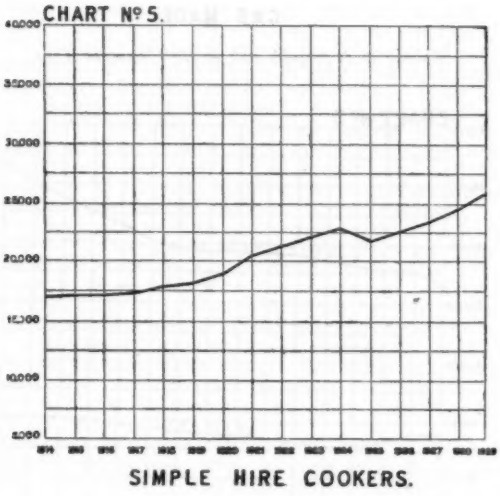
Careers for Young Men.

I should like to express a regret that I think will be shared by most of those who are confronted with the problems connected with the distribution of gas—namely, that up to the present we have failed to attract young men of education and culture in sufficient numbers. Surely the prospects should be attractive enough to offer a career for our young men. I know that many undertakings have tried, and are trying, to obtain the

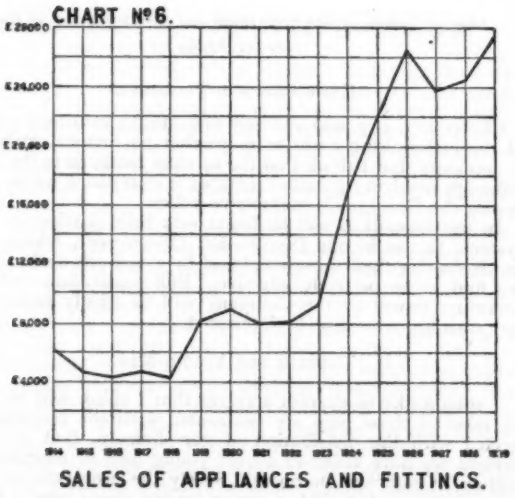
services of young men possessing the qualifications I have indicated. We realize the difficulties, but having realized them, surely it should not be beyond the bounds of possibility to overcome them, as such attributes appeal to all classes alike.



It will be seen that a rapid increase has taken place in the number of gas appliances in the Hull District.



Showing increase in number of cookers hired.



Note the rapid increase in sales of appliances and fittings since 1919.

To-morrow, many of you will be visiting the works of the British Gas Light Company at Hull, where you will see evidence of the progressive policy pursued by the Directors of the Company of which your President is Chairman, and who, as you know, carries on with unfailing energy the high traditions which will always be associated in the gas industry with the name of his father, the late Sir Corbet Woodall.

As one of the Officials of the Company, I should like to place on record the fact that any suggestion either for the benefit of the Company in particular, or for the gas industry as a whole, is invariably received with sympathetic consideration by the Directors.

Finally, I should like to say that the cordiality of our relations with our consumers is largely due to the loyalty and enthusiasm of every member of our distribution staff, and every workman employed. They are rightly imbued with a sense of pride in their service to the British Gas Light Company.

APPENDIX I.

Methods.

There are two Departments:
1. Mains, Services, Meters.
2. Stoves and Fittings.

There are two premises where orders, inquiries, and complaints are received:

Baker Street General Offices.
Showrooms.

Mains, Services, Meters.

All complaints, inquiries, and orders are booked on counter complaint sheets, and jobs are numbered daily.

Each job is entered on slip, numbered, dated, and issued to fitter.

In the case of mains and services, the finished work slip is handed to foreman who books particulars and materials used on cards which are of various colours and headings as follows:

"N" (buff)	New mains.
"M" (pink)	Repair mains.
"S" (white)	New services.
"R" (yellow)	Repair or renew services
"C" (green)	Clearances.

Completed cards are checked with counter sheet, storekeeper's requisition and credit sheets, by clerk and filed.

Meter fitters have similar work slips issued containing instructions and materials and particulars booked under the following heads:

(White)	Ordinary meters.
(Pink)	Prepayment meters.
(Yellow)	Company's fittings prepayment meter.

These are in duplicate; one retained in office and one issued to fitter.

The completed work is checked with counter sheet, duplicate card, storekeeper's requisition, and credit sheets, and details transferred to meter life book, stock book, and rentals.

Stoves and Fittings.

This department has slightly different methods from the other department, inasmuch as no work slips are used.

The order, inquiry, or complaint is first booked in the counter book and entered direct on work cards (coloured, lettered, and numbered) to the various appropriations:

"W" (white)	Complaints and inquiries.
"B" (yellow)	Simple hire.
"BG" (buff on green)	Paid work—stoves.
"G" (green)	Paid work—fittings.
"HP" (pink)	Hire purchase.
"Y" (salmon)	Company's P.P. fittings (reps. and renewals).
"A" (azure)	Company's P.P. fittings (new).

Requisitions and credit sheets on storekeeper have space for letter and number of card to be entered thereon—*e.g.*,

Class	B.
Number	6006.

Materials are booked on the back of the work card.

The coloured four-lettered cards obviate the possibility of confusion.

The work card passes on to the costing clerk and invoice clerk, and is finally checked by the stores superintendent.

APPENDIX II.

Building Operations, 1920-29.

Municipal Housing Schemes.

(1) *Dairycoates.*

First contract issued in April, 1920.
Site completed 1929 with a total of 1442 houses.

Gas for Lighting Not Allowed.

Records taken December, 1928, show that:
1298 of the tenants have gas cookers = 90 p.ct.
1298 of the tenants have gas coppers = 90 p.ct.
288 of the tenants have one or more gas fires = 20 p.ct.
The average annual consumption per meter in 1928 was 24,978 c.ft.

(2) *Cottingham Road.*

First contract issued in December, 1922.
Site completed November, 1926, with a total of 600 houses.

ALL-GAS. NO RESTRICTIONS.

Records taken in 1928 show that:
598 of the tenants have gas coppers = 99·7 p.ct.
570 of the tenants have gas cookers = 95·0 p.ct.
108 of the tenants have one or more gas fires = 18 p.ct.
The average annual consumption per meter in 1928 was 29,648 c.ft.
"Cookanheat" ranges installed on this site.

(2a) *Cottingham Road Extension.*

First contract issued in March, 1929.
Site completed March, 1930, with a total of 226 houses (12 all-electric).

GAS FOR LIGHTING NOT ALLOWED.

Records taken June, 1930, show that:
214 of the tenants have gas coppers = 100 p.ct.
137 of the tenants have gas cookers = 64 p.ct.
17 of the tenants have one or more gas fires = 8 p.ct.

(3) *Willerby Road.*

First contract issued April, 1929.
When completed the site will contain 650 houses (12 all-electric).

GAS FOR LIGHTING NOT ALLOWED.

225 houses completed and occupied December, 1929.
273 houses completed and occupied June, 1930.
152 in course of erection.
498 houses occupied at end of June, 1930 (12 all-electric).
Records taken June, 1930, show that:
486 of the tenants have gas coppers = 100 p.ct.
210 of the tenants have gas cookers = 43·2 p.ct.
25 of the tenants have one or more gas fires = 5·1 p.ct.

PRIVATE ENTERPRISE BUILDING ESTATES, 1921-29.

2690 have been erected.
24 all-electric = 0·81 p.ct.
57 all-gas = 2·12 p.ct.
2611 electrically lighted. gas heating and cooking = 97 p.ct.

The Sale of Gas for Industrial Purposes

By Mr. H. H. CREASEY,

Manager, Special Service Section, Gas Light and Coke Company, London.

[Abstract.]

I am particularly gratified to have the opportunity of addressing this meeting, because I had the honour of reading a paper at the first Conference of the Association held at Manchester, in October, 1912. The President on that occasion was the late Sir Corbet Woodall, to whom the gas industry in general, and this Association in particular, owes so much. This is, therefore, a particularly auspicious occasion to me, because 18 years later I again have the honour of addressing you, this time under the Presidency of Mr. Henry Woodall, now the Deputy-Governor of the Company of which his father was the distinguished and highly-regarded Governor.

On the first occasion my subject was "A Campaign Among the Doctors," because members of the medical profession enter so much into the home lives of the people, and, therefore, have considerable influence in connection with their use of gas for various domestic purposes. That campaign was of immeasurable value, for its results reach far beyond the bare yet wonderful statistical facts that we have to-day 5412 doctors, 206 hospitals, and 512 nursing homes using gas fires as compared with the figures of 1912—namely, 2484 doctors, 84 hospitals, and 114 nursing homes.

To-day I am to deal with the uses of gas for industrial purposes to illustrate the very prominent part that gas plays in the manufacture of all the various things needed in our complex civilization, including the preparation of various foods and other necessities of life.

This paper is confined mainly to a brief history of what one Company has done and is at the present moment doing in connection with the sale of gas for industrial purposes, and I have naturally been unable to make more than a short reference to what other undertakings and their representatives have been doing at the same time.

We of the Gas Light and Coke Company are fully appreciative of all the valuable work which has been carried out by other prominent undertakings and their representatives, notably by the Birmingham Corporation Gas Department, and they, I am sure, will understand that this does not pretend to be anything more than a record of the work of one among many workers.

EARLY EXPERIENCES.

Comparatively little gas was used for industrial processes 36 years ago—a startling difference from the present time, when the printing firms alone in what is known as the square mile of the actual City of London, consume about 300 million c.ft. per annum, 85 p.ct. of which is for industrial purposes.

I should here state, however, that we were then beginning to get more in touch with our customers, because a few years previously (rather more than 40 years ago) we had commenced to hire and actually fix some gas cookers, fires, and heating stoves, which we also attended to when complaints were received.

Apart from this, nearly all work was then carried out by private gasfitters, or in the case of institutions, large trading firms, and factories, by their own engineers. Hence, as I have said, we were seldom consulted or even considered in connection with gas for trade processes. The firm's own engineer usually chose or designed, installed, and more or less kept in condition, any gas-fired appliances which were used. As a result the comparatively small amount of gas thus consumed was very frequently entirely misapplied, or in any event was uneconomically applied, and the appliances themselves were at times badly fixed and worse maintained. In fairness to these engineers I would repeat that we ourselves then knew nothing or very little of the subject, and only exhibited a very detached interest in the proceedings.

I will now refer to the beginning of our Industrial Demonstration Workshops and Showrooms at Goswell Road. Many of you knew Mr. B. W. Brooks, who was in charge of these premises until a few years ago, and he has given several papers on industrial subjects—one of which was read at your Annual Conference at Sheffield in 1920.

Mr. Brooks was an Inspector on the Blackfrairs District for some years previous to 1911, during which period he naturally came into contact with the large printing and publishing firms, and as by then we were "sitting up and taking notice," and he was a good technician with a flair for invention, he endeavoured again to interest them in the use of gas for metal melting.

He started experimenting on this in a small room at Goswell Road, and met with some degree of success, while at the same time he was also studying some other industrial processes, particularly those connected with the tobacco trade, of which some of the largest firms had branches on his district.

We had then for some time realized the increasing importance of the industrial load, and that, unfortunately, we knew very little about it. As Mr. Brooks showed such an aptitude for the work, he was transferred in 1911 from his position as Inspector to that of Technical Demonstrator, more workshops space being given to him in which to continue his experiments.

From that date our activities grew so rapidly that it soon became necessary to erect larger premises. In 1927, Mr. Brooks left our service to take up a directorship with one of our largest industrial consumers, and one of our Special Service Section representatives, Mr. W. Dieterichs, was appointed as his successor. Since then still further and considerable extensions have been made at Goswell Road, with very profitable results to our consumers and to the Company. Incidentally, the Directors are now shortly transferring the whole of this work to Watson House, where more extensive premises will be allotted for industrial process work alongside the existing workshops and laboratories, and more intensive and better co-ordinated experimental and research work will be carried on.

In the closing years of the war your Executive Chairman held several meetings (at which I was present) with a view to thinking out ideas and organization for the industry, in order most fruitfully to deal with the position which would arise when the war ended.

PREPARATION OF FACTORY ORGANIZATION.

A Committee was ultimately formed including representatives of the "B.C.G.A." and our Company. This Committee, of which I became Chairman, prepared details of some useful information for any organization which was to deal with factories and their industrial processes.

In our view, an essential preliminary consisted of the preparation of lists of all the known industries and subsidiary branches and of all their heat processes which could be carried out by gas. We discovered more than 3000 industries and branches of industry, and an average of seven possible gas-heated processes in each. This obviously does not mean 21,000 processes, as various industries carry out similar processes; moreover a firm engaged in an industry or a branch of an industry may not themselves carry out all the requisite heat processes because they contract out some of their work. As far as we ascertained, there are about 80 major processes.

Directly the war ceased, our first representative and subsequently others who were added to the Section from time to

time to be trained as industrial representatives or their assistants, were instructed to approach owners of factories who had first transferred their activities from peace products to war products and then back from war products to peace products. Such changes involved either the danger of our losing business, or, alternatively, opportunities for increasing it, because many of the firms concerned were changing over their apparatus from one kind of work to something entirely different, for which their existing methods of applying heat were unsuitable.

Method of Approach.

The system we adopted was to send a letter to each customer stating that our expert representative, Mr. A. B., would call shortly to give advice and assistance (*a*) on the condition and suitability of each appliance for the purpose for which it was used; (*b*) on the installation of new apparatus for any process of manufacture which might be contemplated, or for which the consumer was not at present using gas; and (*c*) on the maintenance of existing appliances in a state of full efficiency, for which purpose the Company had trained and equipped a special staff.

This work has gone on steadily increasing, and assistant representatives have been promoted to industrial representatives, and others have from time to time been added to the staff.

We have now nearly 17,000 factories and workshops on our area of supply, and 15 industrial representatives and 5 assistants who are continuously and solely engaged in dealing with these consumers—and I am confident that this is far below the number who could be profitably employed in this field.

Formation of the Industrial Salesmen's Circles.

In March, 1924, your Executive Committee decided to consider the formation of an Industrial Salesmen's Circle, and a meeting of representatives of those undertakings which were particularly interested in the development of the industrial uses of gas was held on Dec. 1, 1924.

At that meeting the idea was approved and arrangements were subsequently made for the first meeting of the circle to be held at Leeds on March 6, 1925.

Support from the Technical Press.

The Technical Press have done much to help the industry by disseminating information collected from various sources at home and abroad. The "Gas Salesman," published by the "Gas Journal," and the "Industrial Gas Supplement," published by the "Gas World," contain a great deal of matter very useful to the industrial salesman; details of some installations in various parts of the country; methods of application of gas to various processes, and articles by industrial representatives.

Examination of Factories.

I have already mentioned that a number of years ago lists were prepared including all the various known industries and their branches and the processes carried out by each of these in which it was considered gas could be utilized. Our representatives' knowledge of what they should find in consumers' premises has, of course, considerably increased since then, but we must remember that we cannot always be certain that any representative who calls on a firm engaged in a particular industry will be fully aware of all the possibilities, so we still consider that these lists are valuable and should be consulted frequently by our representatives and particularly by those in training. We are always on the alert for new processes or new methods of carrying out old processes, and add them to our lists as and when they occur. In order further to assist our representatives in this direction, we have periodical meetings and circulate among them details of our successful applications of gas to various trades.

When we are approaching a customer whose premises we have not yet examined, we send one of our "Obtaining Entrance" letters, to which I have previously referred, and seldom—practically never—meet with a refusal to admit our representative. Our intimate touch with the consumer usually commences from that date.

Such letters are, of course, only sent to absolutely new customers with whom we have not yet got into contact in some other way (now rather an unusual event), or to existing consumers occupying factories or workshops whose installations we have not yet examined and recorded. There are still nearly 2000 of the latter, mostly of the small workshop type, and the reason that we have not yet reached them is the fact that though we have increased the number from one industrial representative to twenty, the amount of work that has arisen out of the preliminary visits to those premises which have been examined, and subsequently from continuous contact between the customers and our representatives, has been so great that after a time each of them has become unable to examine any more (or only very few) of the remaining unexamined premises on his area of supply.

Need for Additional Men.

In order to deal with this happy—though to a certain extent unsatisfactory—position, as fast as we have been able to find suitable men we have added them to the staff; but again, though the representatives' areas have been reduced from time to time, the more consumers in those reduced areas they have called upon, the more business has arisen and continues to arise, until each new representative's time has become fully occupied without his being able to examine more premises, or even to maintain the very close touch with the consumers on his area which it would be both proper and profitable to maintain.

We still wish to add to our present staff, in order that we shall complete and repeat the examinations; but while we are naturally anxious to see the initial task ended and begun over again, I should be very reluctant to take our industrial representatives from their present very productive work in order to do this, especially because, as I have previously stated, the unexamined factories and workshops are small and are, therefore, less important.

Our Directors are fully alive to the needs of the case and are prepared suitably to increase the staff as opportunity affords, in order that we shall not only be able to handle the business which we are now getting and to keep that closeness of touch with these important consumers which is so vital to our present and future prosperity, but also to make even greater efforts to get additional work than are at present possible. The difficulty is to get enough men with all the qualifications of technical knowledge and selling ability required for this very special work. From what I have said it will be realized that we have not yet found it possible to carry out intensive selling campaigns on any particular use of gas for industrial purposes. There is a great field still waiting to be worked in this direction.

When calling at a factory our representative obtains and records useful information as to the appliances which are already in use, and their state of efficiency, suitability, and condition; he also acquires knowledge of the consumer's requirements and problems, in order that he may give suitable advice and assistance to those responsible for the heat processes employed. While on the premises, and subsequently, he naturally tries to obtain orders for any kind of gas appliances for which there are opportunities open.

Over 15,000 factories have thus been examined; our industrial representatives are known to the owners, managers, and engineers of these, and we now have record cards concerning each of them upon which appear details of the purposes for which gas is used and the appliances which are installed. The opportunities which exist for further business are thus disclosed and the cards are ready to form the basis for future attacks on any specific line of business.

In passing, I would mention that in our view the industrial representative who is entrusted with the examination of a factory, should be capable of—and responsible for—dealing with ALL gas fittings and appliances in that factory (other than engines, which are dealt with separately) whether they are used for the heat treatment of the products of the factory, or for any other purposes, such as lighting, heating, central heating, hot water supply, or cooking.

The first visit of our representative almost invariably reveals the fact that gas is not being used as effectively or economically as it should be, and that if suitable apparatus were provided the profitable use of gas could be largely extended—and by profitable I mean profitable to the consumer as well as to ourselves.

Maintenance.

When arranging for the installation or improvement of apparatus in factories, we are aware that we have by no means completed our task and that it is not only our duty, but it should be our pleasure continuously to watch over, or in other words maintain, these appliances in a satisfactory condition for ever afterwards. I am now referring to the old subject, maintenance, which probably applies to industrial apparatus even more emphatically than it does to domestic appliances.

In spite, however, of the outstanding importance of maintaining industrial appliances in a satisfactory condition, and the fact that we have given a great deal of attention to persuading our customers to accept our services in this direction, we have not yet by any means attained complete success.

One of the reasons for this is the fact that in large factories there are usually engineers, who consider (not always rightly) that they are fully capable of overhauling their apparatus, or, as sometimes happens, the process carried out is either secret or somewhat secret, and our customers do not consider it advisable to give access to their factory to too many outsiders.

We have, however, made continuous, if slow, progress in this direction, as an instance of which I would mention that from a firm of wireless apparatus manufacturers we have just taken an order for the periodical inspection of a travelling oven and 200 small pieces of industrial apparatus.

One feature connected with the maintenance of industrial appliances is the fact that it is usually almost impossible to quote a standard rate; moreover, it is sometimes difficult to give the customer an idea of the probable cost he will incur at any particular inspection. For instance, it might be possible to attend to the burners of a furnace for a few shillings, but at times repairs running into some pounds may also be involved.

We have, therefore, found that we cannot usually set up standard charges for industrial appliances, but instead are frequently obliged to work on the principle that we make periodi-

cal inspections and base our charges on the time occupied and the materials used by our men.

In such cases, however, the industrial representative concerned frequently visits the consumer's premises before the maintenance fitter calls, and prepares and presents a specification including details of any repairs which are required. Therefore, while it is truly a system of periodicial inspection, it cannot be considered as coming into line with the ordinary maintenance of gas fires or cookers, because the kind and magnitude of the appliances concerned are so vastly different.

Principal Industries and their Branches.

I have referred to the lists of the known industries and branches thereof which were prepared by a Committee acting for this Association, and would mention that the number seems very large, though it is quite true that this number actually exists. I quite understand that there are not 3000 *major* industries in the United Kingdom, but many have a number of branches, and firms will be found who are actually engaged in one or other of these various branches to the exclusion of any other kind of work.

Take engineering, for example. There are many branches of engineering, and we find that there are firms who are engaged in one or other of these various individual branches. There may be a few firms who carry out the whole of the processes connected with the manufacture of motor cars, but on the other hand, there are firms who only make the chassis, and others who are motor car body builders, and so on. Each of these may carry out one or more different processes in which gas can play a part and which we set out in the lists of industries and the processes which are carried out therein.

I think I should be correct in stating that any firm which manufactures motor cars complete from beginning to end would probably cover the greatest possible number of gas processes which are carried out by any individual trade. The total as far as we know is 27 different processes.

As some degree of confirmation regarding the number of industries and branches which exist in the United Kingdom and also to indicate the amount of knowledge which it is necessary for our representatives to possess or to acquire, I will quote the following actual facts.

I have already mentioned that the total number of factories and workshops which exists on our record cards, with the consumers' names and addresses on each, is nearly 17,000. The total number of actual industries and their branches in which these firms are engaged is no less than 1150, each absolutely different from the other, though it may be a branch of the same major industry.

We also know the number of the various firms who are engaged in each of these, and to give some idea of the position, I set out below a list of industries in respect of which we have 100 or more customers:

General engineers	1076
Clothing manufacturers (ladies and gents)	998
Cabinet makers	949
Printers	824
Laundries	560
Motor repairers and garages	431
Furriers	263
Pianoforte manufacturers	202
Manufacturing confectioners	195
Boot and shoe manufacturers	172
Manufacturing chemists	141
Upholsterers	123
Electrical engineers	121
Dyers and cleaners	113

The foregoing details will give some indication of the diversity of our industrial load and the problems with which we meet in connection therewith—to which subject I refer later.

Canteens.

It is worth mentioning that the canteen is an important adjunct to a modern factory, in which the welfare of the worker is now carefully studied. Our representatives, therefore, always remind our consumers of the possibilities attached to the setting up of a canteen or dining club, and of the value of installing gas cooking appliances in connection therewith.

We meet with a considerable amount of success in this direction, because in the larger factories in the City of London and in our outlying areas, well-equipped canteens are always provided for the workers. Representatives of the Industrial Welfare Society always visit works in which a number of employees are engaged, with a view to encouraging the employers to introduce a canteen if one does not already exist.

As far as our records go, gas, as it should do, appears to be used in all our factory canteens; indeed all-gas kitchens are common, while electricity is only installed in a very small proportion of cases and then only for minor operations or sometimes for baking ovens.

Central Heating.

A certain number of gas-fired central heating systems have been in use for industrial purposes for some years—for instance, in drying rooms by motor coach and body builders—but until recent years we had no case in which a factory was centrally heated by gas-fired boilers purely for heating purposes, apart from trade processes.

This also applied to other kinds of premises and to large residences; but a number of years ago, with others, I came to the opinion, that, whether we liked it or not, the use of central heating methods would gradually spread in this country, at least as regards new buildings of various kinds, and that if the gas industry did not cater for this load, we should lose important prospective business for gas.

A few years ago central heating was always carried out by either coke or anthracite, but as oil was beginning to come into the picture, I felt that we should at least attempt to get gas adopted for the central heating load wherever the conditions afforded the necessary opportunity.

I would here mention that my Company have recently extended to central heating by gas the same scale of discount as we grant for manufacturing purposes. As a result of this concession, the load is now continually growing, and while the figures are, of course, comparatively small, it is pleasing to note that we have now no less than 85 consumers who are centrally-heating their premises or residences by gas-fired boilers. Of these 85 there are 10 cases in which we have installed gas-fired boilers for centrally-heating factory premises. As an indication of the value of this new load, I may mention that in 1929 the average consumption per installation for central heating purposes was nearly half a million c.ft. per annum.

Fish Frying.

Before referring to one or two new processes or new methods of carrying out old processes with which we have dealt, I will now mention fish frying, a subject which has been referred to by other speakers during the past few years. We look upon a gas-fired fish fryer as a kind of furnace, and our customers at fried fish shops are, therefore, dealt with by our industrial representatives.

Some years ago we began to give more attention to this problem, since when we have from time to time tested (and, indeed, have ourselves constructed) various kinds of fish frying furnaces at our industrial showrooms and workshops. We have always done this with a view to persuading the manufacturers of standard fish fryers to alter their construction to suit our ideas if we disagreed with any method of the application of gas which they had adopted. Please note that we do not wish to become manufacturers of gas-fired fish fryers.

This system has worked very satisfactorily, and we believe that at Goswell Road the use of studs *welded* on the bottom of the pans was first adopted. Some manufacturers, while not necessarily accepting our ideas in respect of all furnaces which they sell, have agreed to supply us with this particular type of pan, fitted with burners which we approve, in any furnaces which we may require.

Though we have only concentrated on this business for a comparatively few years, the results to date are very gratifying. We have now 183 fried fish shops in our area of supply using gas-fired furnaces. The total consumption of these 183 shops for the past 12 months was 72 million c.ft., or an average of nearly 400 thousand c.ft. per annum per installation.

The business is constantly increasing—indeed one of our representatives has just obtained orders to install gas-fired furnaces for six additional fish-fryers on the area upon which he is engaged.

Gas is both Ancient and Modern.

One sometimes sees in the Press statements by interested or misguided people, which imply that electricity is the only modern thing to use. It cannot too frequently be shouted from the house-tops that this is not true; gas is just as modern as electricity, and it can be applied to most up-to-date processes. Indeed, we can claim something that the electricians cannot—somewhat on the lines of the hymn book—namely, that we are both ancient and modern.

As an example, I would instance the manufacture of wireless apparatus, which, while not being absolutely new, may certainly be spoken of as modern. Not long ago we dealt with a case where a new method of carrying out the process of impregnating wireless parts with wax was introduced, and gas was utilized as the heating agent. Then we have what is known as Parkerizing—much the same, I believe, as Sherardizing—a process in which gas is utilized for preventing rust on metals.

The motor car industry, though not new, is always improving its methods and, indeed, adopting new processes. In that direction not long ago we applied gas to what is known as a de-greasing plant. In this case gas is used for converting liquid chemicals into vapour, for the purpose of removing grease from the parts of motor cars which have been in use and are being repaired.

We recently dealt with a very interesting process which consisted of heating jacketted mixers of bitumen compound by means of oil, which was raised to a temperature of 600° F. from a central oil-fired boiler, and the heated oil circulated through pipes in the jackets of the mixing appliances. The plant was duplicated, and when a breakdown occurred the standby plant was brought into use. Through some mischance,

there was an explosion, and our representative, who approached the firm's engineer, obtained permission to experiment with gas. The result was that burners were made at our workshops and fitted to the mixers. Eighteen burners in all have thus been fixed, and the oil plant has been put out of use; moreover, gas has been found to cost much less than the oil-fired system, and the output of material has also been increased.

Some years ago Mr. Brooks experimented with what are known as immersion heaters—*i.e.*, gas burned in tubes or chambers which are immersed in the solution or liquid which is to be heated. We continue to make improvements in this direction and a considerable amount of business has resulted. You have all heard of submerged combustion and some of you have no doubt carried out experiments with this method of applying heat by gas. We are just installing a trial plant for varnish boiling, which, if successful, will no doubt help us to retain and extend our business in connection with this very important process.

We are always ready to investigate new processes or methods of any kind in any industry, and indeed have already materially improved our position as regards the use of gas for varnish boiling because of this.

We have recently constructed a gas iron to be used for soldering in vacuo, a process which we succeeded in carrying out at Goswell Road, after a great deal of experimental work. The process is at present being carried out by electric irons which are costly to install and somewhat difficult to maintain, and we hope, therefore, to obtain an order for more than the initial iron which is now on trial at the consumer's premises.

We are constantly meeting with cases where steam is applied to industrial processes and have been successful in supplying gas for the purpose. Sometimes a large unit is adopted to supply a number of machines; in other cases small self-contained steam raising units are utilized. Some of these processes are vulcanizing, clothing presses, hat-blocking, matrix-making, pleating, heating plating solutions, silvering, bending vulcanite, steaming velours, and a number of smaller operations.

Whenever we are successful in dealing with matters of interest or importance we arrange for photographs to be taken, some of which have appeared from time to time in "A Thousand and One Uses for Gas." We also include them (with covering descriptive matter) in an album to which we are now continually adding, and which is available for inspection by all interested consumers, either at our chief office or at Goswell Road, and forms a valuable book of reference for the staff.

Consulting Engineers.

In order to assist us in getting the earliest possible intimation that factories are about to be reconstructed or erected, and to ensure that as far as possible any consulting engineer who may be called in will come to us for advice—and at least not be prejudiced against us—we arranged in 1921 to bring consulting engineers into the same scheme as that previously adopted as regards medical men, architects, surveyors, and estate agents, who are constantly in touch with the general public.

All consulting engineers are now dealt with by our specialists, and as a result a large number of them now use gas for various purposes in their offices and homes who did not previously do so. Because they are specially carded and recorded we can approach them from time to time with suitable propaganda on all kinds of subjects.

We have found that this system is invaluable, because consulting engineers now frequently write to us for advice and assistance concerning new buildings with which they are dealing, and though, of course, these are not always factories, or even on our area of supply, we and the industry are the gainers thereby.

Manufacturers of Gas-Fired Appliances.

It is obvious that there are firms who may be fully qualified to deal with the construction of their own appliances, but who are not necessarily (or indeed are quite improbably) experts in the application of gas to them; moreover, it is remarkable that in many cases they approach neither the "B.C.G.A.," their local gas undertaking, nor gas apparatus manufacturers in this respect. I consider that it is incumbent upon all of us to investigate the apparatus supplied by all such firms and to persuade them to allow us to assist them in applying gas in the best possible way as regards economy, perfect combustion, the removal of products, and so on. Anything we do individually in this respect may not materially affect our own undertaking, but I maintain that what is good for the gas industry is good for all those who are engaged therein.

There are, of course, firms who have come to us in this respect or alternatively have accepted any suggestions which we may have put before them.

Competition.

I have previously mentioned the keen competition with which we are meeting. This now arises from various sources, such as producer gas, oil, and electricity. Coal is almost extinct and coke has materially decreased as a fuel for industrial processes.

Now I cannot speak for other undertakings, but I can definitely state that while we are meeting with such competition, we are not losing much business in either direction, or it would perhaps be more correct to state that we lose little existing business, but rather do not obtain some of the additional business which we should have obtained if no such competition existed. As far as producer gas is concerned, we sometimes lose, while on the other hand we sometimes regain business which we lost some years ago. For instance, a very important firm of varnish manufacturers have recently given up their producer plant, and we have converted all their furnaces to town gas. In another instance a firm which consumed more than 75 millions in 1929 and are building new works, were seriously contemplating installing a producer plant, but have given up the idea and instead are installing eight 6000 c.ft. per hour meters—a capacity of 48,000 c.ft. per hour.

We feel that in some processes oil may be a more serious competitor in the future, but at present we usually only meet with it on our outlying areas.

Electricity is occasionally adopted, but only for comparatively minor processes. On the other hand, we occasionally displace electricity in some of the comparatively few cases in which it has been adopted for process work, and moreover at times displace it for lighting. To take the latter first, we fixed gas lamps for a consumer a few months ago in place of electric lighting, because gas lighting was considered to be more satisfactory for the particular kind of work, which was printing in gold leaf on transparent paper. The consumer has since expressed complete satisfaction with the installation.

In several cases we have displaced electric irons for pressing and finishing shirts and collars in course of manufacture.

One other very important case I must mention because it so strikingly illustrates all that I and others have so constantly said about the necessity for maintenance of the consumer's appliances in order that our competitors shall not have an easy prey. The firm concerned were extensively using gas for soldering joints when assembling wireless receiving sets, and unknown to us they had experienced trouble in having sets returned as defective, because joints had been soldered badly, arising from the fact that the consumers had themselves been attending—or not attending—to the irons. A new works manager was appointed, and as he proved to be rather in favour of electricity for the process, he arranged for benches to be fitted with electrically heated irons. Our representative who learned this on making a visit to the works, immediately put before the firm the relative costs and comparative efficiencies of properly maintained gas appliances, and as a result all the gas-heated soldering iron stoves (which were in a very bad state owing to unsatisfactory maintenance) were sent to our workshops, and were thoroughly overhauled and readjusted. They have now been refixed, the use of electricity has been discontinued, and moreover we have just received an order for 44 additional irons.

Results of Working in Year 1929.

I have now reached a point in this very lengthy paper at which I may usefully quote some figures concerning the results of our efforts during 1929, our position in this respect to date this year as compared with last, and short details of some important or interesting orders taken during the current year.

During the year 1929 our industrial representatives obtained orders for the following additional appliances:

Cookers	745
Water heaters	240
Fires and heaters	3,481
Lighting burners	2,944
Industrial appliances	3,147
The money taken for the sale and installation of appliances was	£38,543
Estimated additional annual consumption of the appliances installed was no less than	1¼ million therms or 250 million c.ft.

It is worthy of note that only 666 industrial appliances were installed in the year 1921, as compared with 3147 last year, and that the total additional number in the past nine years is over 16,000, or an average of 1777 per annum.

Our position to date in the first 38 weeks of the current year is also very gratifying, because we have increases in most directions, especially noticeable as regards the installation of water heaters, lighting burners, and, the most important item of all, industrial appliances, in respect of which we have installed no less than 2995 compared with 2330 in the same period last year.

The amount of money taken for the sale and fixing of appliances is also well up at £34,306 against £31,642 last year. These—perhaps I may be forgiven for calling them wonderful—figures, have all arisen in a period of very bad trade.

Dealing with Consumers' Problems.

The industrial appliances covered by the figures just given are of various sizes, some small and some very large. Some of them are of standard patterns, some are supplied by the customers themselves, some are made at Goswell Road, and many others are not really gas appliances at all, but consist of some pieces of process apparatus used by the customers themselves, to which gas burners may or may not be already applied.

If the former and the results are unsatisfactory, our repre-

sentative points this out to the customer and endeavours to get an order suitably to reconstruct the apparatus. If the latter, we start *de novo* with the problem of how best to adapt it to gas, and experiments (call it research work, if you like) are then carried out either on the consumer's premises or perhaps with his apparatus and materials at Goswell Road.

It is absolutely correct to state that scarcely a day passes without its problem presenting itself. This will, I think, be appreciated when it is remembered that, as previously stated, we have no less than 1150 different industries and branches thereof in actual operation in our area of supply, and that in any one of these branches two manufacturers may approach a process from a different angle, involving special treatment of what is the same problem but which presents different features.

At times we are dealing with as many as fourteen or fifteen different problems at one and the same moment, some of which call for scientific research, but the majority usually need only the exercise of ingenuity and the application of our existing experience and technical knowledge on the particular—or some allied—subject. It is pleasing to state that we seldom, I might almost say never, fail to solve our consumers' problems.

When we construct any gas-fired appliances we make it clear to manufacturers that we have no intention of competing with them by manufacturing these when they have been more or less standardized. Our main purpose is to design appliances for new applications of gas with the intention wherever possible of creating such a demand for them as will ultimately warrant standardization, except, of course, in cases where the consumers wish the process and/or the appliance to remain secret.

When the stage of standardization arrives we desire that manufacturers should take over production from us, in order that we may be free to tackle fresh problems. We also make it clear to manufacturers that while we shall be the most severe critics of the gas appliances they sell to our consumers, we are prepared to give all the assistance we can in making improvements in them. The only condition we make is that the improvements made or suggested by the Company shall be applied generally and shall not be confined to the products of any one manufacturer.

Some Important Orders in 1930.

Following are details of some orders taken during the current year:

Trade.	Hourly Consumption of Appliances Installed.
	C.Ft.
Electric apparatus manufacturers	24,000
Paint and varnish manufacturers, in place of suction gas	14,000
Publishers—"Daily Mirror" new premises	8,000
Electric insulating material manufacturers	6,000
Wireless manufacturers	6,000
Can manufacturers	6,000
Boot polish manufacturers	4,000

We recently made a specially designed furnace for a well-known safe manufacturing firm in which they test their fire-proof safes.

The General Electric Company is our second largest industrial consumer (with an annual consumption of over 90 million c.ft.), and this firm are now extending their works at Wembley, for which we have run a new 12-in. main into the factory and have already installed a 9000 c.ft. per hour high-capacity meter.

We have recently put in an additional 6-in. service for a well-known international firm who are engaged in the metal industry, and who now have a gas installation with a capacity of 16,000 c.ft. per hour in their factory in our area. We made them three specially constructed double-deck furnaces, and have just received a letter from them stating that these furnaces are considerably more efficient than any of similar type which they have previously used.

Magnitude of Industrial Gas Consumptions.

A great deal has been said from time to time as to the value of the industrial load to the industry, and greater attention is now being paid to it. I trust that I have already given some indication of its value to my own Company, but as I feel that it is possible that its present magnitude and future importance are not fully realized by many of us, I will now give a few figures regarding other undertakings and also some further details regarding our industrial load as far as it has been ascertained and analyzed.

We were all gratified to learn from the Board of Trade returns for 1929 covering all statutory undertakings, that there was an increase in sales of 10,168 million c.ft. over 1928, or 3·6 p.ct. Now, it will be interesting to consider what proportion of that increase arose out of the industrial load, and at what rate the industrial load is increasing in comparison with the industry's total increased sales.

With a view to getting some idea in these respects as regards the whole industry, apart from my own undertaking, I have examined the valuable figures set out in the "Gas World Year Book," and consider that, while they are not as fully informative as one might desire, they do throw some light on the situation.

I found that of the 1098 undertakings in England and Wales the percentage sold for industrial purposes is only quoted against 253 of them, and that the highest percentage of the total output which is quoted as sold for industrial purposes is 50 p.ct. by the Goring Gas Company. The total sales in millions of these 253 companies was 122,486 millions, of which 18,676 were sold for industrial purposes, or an average of over 15 p.ct.

In Scotland, of the 232 undertakings, the percentage sold for industrial purposes is quoted in 54 cases and the highest of those is 42 p.ct. by the South Queensferry Company. The total sales of the 232 undertakings were 19,324 millions, of which 2131 were for industrial purposes, or rather more than 11 p.ct. In Ireland, 84 undertakings, of which 26 quote their industrial percentage, the highest is 11 p.ct. by the Dublin Company. The total sales of the 84 undertakings was 6570 millions, of which 658 was for industrial, or slightly over 10 p.ct.

It is worthy of note that in some cases this percentage may chiefly arise out of the consumption of only a few large consumers. In others it may truly be stated that the undertaking supplies an industrial area, such as Birmingham and Coventry, in each of which cases the percentage is very high. These factors, however, do not apply to the Gas Light and Coke Company, as its industrial load is well spread and very diversified in character, and London can by no means be spoken of as an industrial city.

One notable feature of the figures given in the "Gas World Year Book" is that many important undertakings who unquestionably sell a great deal of gas for industrial purposes, do not quote any percentage at all. Take our own Company, for instance. Our total sales in 1929 were 46,849 million c.ft., but no percentage for industrial purposes is shown, and the same applies to the Newcastle Company with total sales of 4937 million c.ft.

I cannot speak for other undertakings, but I feel that if a company does quote a percentage for industrial usage, it should be quite clear what is meant. In other words, does the percentage quoted represent gas sold for industrial purposes *only* at factories, and not including the consumptions for other purposes at the same factories? The reason a percentage is not quoted by our Company is the fact that it is not an easy matter to give exact figures.

In many of the factories in our area the industrial load is not separately metered. In spite of this, however, I can give some figures which show the magnitude and importance of the load to us. We give a discount for gas used for industrial purposes, and this starts at 12½ p.ct. off 350 therms in a quarter and rises by gradations to 20 p.ct. To enjoy this discount, the industrial consumption must be separately metered, or in rare cases a certified "manufacturing purposes" percentage is agreed of the gas which is consumed through a meter which includes gas consumed for other purposes.

Now in 1929 we had 3167 consumers who thus consumed more than 350 therms per quarter, and they therefore qualified to receive industrial discount. The figures are readily extractable and we ascertained that these firms consumed no less than 2637 million c.ft. for industrial purposes alone. But we also know that they consumed 350 millions for general purposes and about 130 millions for power, so that the total gas consumption of these 3167 consumers was 3117 millions, or nearly one million per annum each. It is worthy of note that the manufacturing purposes consumptions in these factories were more than seven times those for general purposes, excluding power, and that our gas engine consumption is quite a substantial item. We still have a total of 2000 engines in our area, and their consumption for 1929 was 384 millions. Indeed, we have recently installed a number of new gas engines, one in place of electric motors.

But the huge consumptions I have mentioned only concern 3167 out of nearly 17,000 factories. What of the remainder? Some of these are, of course, merely workshops with a small unit or units by which gas is used for manufacturing purposes and is not separately metered. Such, for instance, as a tailor's iron, a few soldering irons, a few tool heaters, a machine for gold blocking, and so on; but in no case does the consumption reach 350 therms in a quarter, and they, therefore, do not qualify for our manufacturing purposes discount.

Without a considerable amount of trouble and analysis I cannot give the total industrial load of these over 13,000 consumers, but it is obvious that it must be substantial. We do know, however, that they have more than 1200 gas engines in use, with a consumption of 123 millions. By a conservative estimate I calculate that at these factories and workshops 1270 millions is consumed for industrial purposes, 140 millions for general purposes, and 123 millions for power, or a total of 1533, which, added to the definitely ascertained figures 3117, makes a grand total of 4650 millions, made up of 3907 millions industrial, 490 millions for general purposes, and 253 millions for power.

The average annual consumption at each of these factories and workshops is, therefore, 273,529 c.ft. compared with 36,975, which is the average per consumer in my Company, and 44,391 per average *ordinary* consumer throughout the whole country,

according to the Board of Trade's figures regarding all statutory undertakings. The importance of the industrial load I think, therefore, becomes more than ever apparent.

Increase of Industrial Consumption.

I will now give some further striking facts regarding the rate of increase of this industrial load, as compared with the general rate of increase. In this case I will only quote the 3167 consumers, whose industrial purposes consumption has been definitely ascertained. These consumed 2398 millions solely for industrial purposes in 1928 and 2637 for the same purposes in 1929—an increase of approximately 10 p.ct., compared with our *total* sales increase of only 4½ p.ct.

A final proof of our rapid increase in gas consumed for industrial purposes is the fact that our known (not estimated) consumption in this respect increased by 50 p.ct. in the five years from the beginning of 1925 to the beginning of 1930 (after making due allowance for the addition of the late Brentford Company) against the 14 p.ct. increase given in the "Gas World Year Book" for the whole of the gas sold in the British Isles in the same period.

I will now close my statement about consumptions by giving some figures concerning our 28 largest consumers of gas for industrial purposes. This number only includes those industrial consumers whose total consumption each exceeded 15 millions in 1929.

1928.

—	Industrial Consumptions Only.	Other Purposes.	Total.
	Millions.	Millions.	Millions.
28 largest consumers . . .	788	454	1242

1929.

—	Industrial Consumptions Only.	Other Purposes.	Total.
	Millions.	Millions.	Millions.
28 largest consumers . . .	904	469	1373

It will be noted that the industrial consumption of these 28 consumers increased from 788 in 1928 to 904 in 1929, or 14·7 p.ct., while that for general purposes only increased from 454 to 469, or 3·3 p.ct.

The Educational Aspect.

I would here say a few words about the educational aspect as regards the past, present, and future. In the early days before we specially dealt with factories our inspectors were not always very expert technically. Then came the period when it was considered necessary for them to study in this respect, but before we had advanced very far, my Section took over the specialized dealing with factory premises. Our early industrial representatives were men who had not gone through the modern intensive methods of training, but had learned in what I call the school of adversity, which in the end almost every man must and assuredly will pass through. At the present time some of those who are transferred to me have been through a course of training which covers almost everything necessary to a salesman except a salesman's course, which the Association is now considering. Whenever such men are diverted to industrial work, they (just as others of my industrial staff have always done) spend a number of months at our industrial workshops and showrooms, and also act as assistants to some of our representatives.

In the old days we had the school of experience and adversity. We now have some young men with training and sound scientific education, but little experience. As the years go on, we shall have scientific education, training in the art of selling, and the fruits of experience. The man of character who combines all three upon a basis of right personality should be an industrial super-salesman.

One thing, however, stands out in my mind, and that is that any such course of training must always include actual experience in dealing with customers in connection with the installation of gas for *all kinds of purposes,* and not only regarding industrial uses; because in my experience, when one of our representatives goes into a factory, he will frequently meet with possibilities concerning the installation of all kinds of appliances, such as domestic water heating, cooking, gas fires, central heating, some of which may arise owing to the fact that the premises include offices, or perhaps a manager's or partner's residence.

I have a strong and inflexible opinion that a representative who deals with a customer should be capable of handling anything which he may meet on the premises, unless it is a highly technical problem which obviously needs studying, and possible reference to his research department. By this I imply that a man who is an engineer with the greatest possible qualifications might be very valuable when dealing with some very particular problem in a factory, but if he had not been through the mill and dealt with customers generally, some other man will have to be called in. I am, therefore, confident that specialized training should always include general subjects and experience in ordinary district work.

The heat process work in many factories is so closely related to mechanical processes and to the whole organization of the factory, that the Company's representative, though primarily concerned with the application of gas to heat processes, must have sufficient engineering and metallurgical or technical knowledge to understand the factory manager's larger problems if he is to win his confidence and successfully compete with alternatively fuels. Knowledge of this kind can to a large extent be acquired by experience gained when employed on or studying gas problems in the factory, provided the man is of the right type and has had the necessary technical and scientific training and has, moreover, been trained to think out problems for himself.

Joint Discussion on the Papers by Mr. Copp and Mr. Creasey.

The President: We have listened to two most interesting and able papers, and I am sure there will be a good discussion on them. I myself am fortunate in being connected with a Company so ably served by Mr. Copp for many years, and I know how thorough that Company is in its methods. The use of gas for industrial purposes has an enormous field, and I think we are all realizing this more than ever. In this connection I think we have to consider the question of methods of charging.

Mr. R. Halkett: I am very pleased to have this opportunity of speaking on these papers, because they are the sort of communications which are of vital importance to the gas industry. I agree with Mr. Copp that service to the consumer starts in the retort house, and I would even go further, and say that it starts from the purchase of the coal until it is consumed in the form of gas by the consumer. It is most essential, as Mr. Copp pointed out, that we should ensure a regular quality and specific gravity of gas coupled with efficiency and regular pressures. These points are most essential in order that we should give the consumer the best possible service. I quite agree also with Mr. Copp when he says that we should look to our bye-products, because we are meeting with such competition in the coke market from our competitors the coke ovens. Therefore, it is necessary that we should do our very best to produce the best possible articles for our consumers. I consider from past experience that we have a very large outlet for coke for domestic purposes provided we supply the proper article to our consumers —*i.e.*, we should see to the grading of the coke and also that it is properly cleaned. We are unfortunately losing a great deal of the market we had. We ourselves had a splendid business for many years, and we sent it down to the South of England and also into Scotland; I am confident there is room for an outlet for all the coke produced by gas undertakings if it is properly prepared for our consumers. Mr. Copp has used the expression of selling an article to a more or less unwilling purchaser, but I would prefer to express this as selling to a consumer who does not definitely know his requirements, because customers often come into our showrooms without the slightest idea of the article they require. Therefore, it is up to our salesman to inquire what their wants are and to place before them the proper appliances for the particular purpose. It may be said that the salesmen get consumers who are very troublesome and try their patience considerably; but the salesman should never allow the consumer to notice that he feels this, and the salesman must continue, under all conditions, to give the best attention possible to the consumer.

Then Mr. Copp speaks of maintenance; and I think most gas companies have a maintenance scheme in operation. Mr. Copp himself has gone into this matter in a very thorough manner; and I think it pays. My Company has at the present time a scheme for the maintenance of burners, which we attend to once a fortnight at an inclusive charge of 5d. a month. We do not maintain gas fires, but we have a considerable number of water meters; and our inspectors have to make extra calls in respect of these, and are, therefore, able to gather information as to whether there are faulty appliances on the premises. In such cases we put things right at the net cost of the material.

I also notice that Mr. Copp states he has 56,000 consumers and a total of 69,000 appliances. That speaks very well for the organization in the Sales Department. It shows they are alive to the job of getting appliances out on to the district. I am also pleased to see that Mr. Copp has obtained the good feeling of the plumbers in the district, because I think that is very essential. The plumber often comes into touch with our consumers in other lines of business, and a word by him may be either detrimental to the gas undertaking or a help to it.

Coming to the industrial side, this is a matter on which I

have very strong opinions, because I think it is a field which the gas industry can look to for large consumers in the future. I do not apply this only to the industrial cities, for I think it refers also to other Provincial towns, because there are many trades and businesses which, if we have the right staff to keep in touch with the consumer, we shall be able to supply.

I hold very strongly the view that, in order to foster the industrial load of the town gas industry to the utmost limit, full liberty as to the method of charging is essential. Our greatest competitors in the industrial heating field are raw coal, fuel oil, and producer gas. There is, however, no heating process so far as I am aware which town gas cannot do, not only as well as, but better than, either of the above fuels. My own experience on this subject leaves no doubt in my mind that to-day there are few manufacturers using large quantities of fuel who would not prefer to use town gas than coal, coke, oil, or producer gas. Modern intensive methods of manufacture and the present-day demand for accurate heating between narrow temperature limits necessitate the use of a fuel which is flexible and easy to control. Unless town gas can show an advantage over raw coal, the existing crude methods of burning solid fuel with all the dirt, smoke, and inconvenience inseparable from them will continue to be used, or else a gas plant will be installed and worked on site if the demand is sufficient to warrant it, despite all efforts of the gas industry and the many advantages of town gas.

Bid for the Larger Operations.

It is not necessary or possible to reduce the price of a therm of town gas to the cost of a therm of raw coal before it becomes profitable to use it. In many processes it is essentially a sound commercial proposition to use town gas at current prices, although, if fuel costs merely were taken into consideration, it would be found that solid fuel would be cheaper. There would be no difficulty in giving a number of instances where town gas is employed regularly; and it pays to use it despite the fact that its cost as a fuel is more than twice as much as its competitor. My contention is that surely the gas industry is not going to rest contented with the process where it pays to use town gas almost at any price without making a bold bid for the really large operations. The system of charging for gas on the present sliding-scale basis is hardly the best one to encourage the use of gas for all purposes. In order to make the best possible use of the capital expended in gas-works plant and distribution mains the sound policy would be the bold and generous one of encouraging the industrial consumers with terms so attractive that it would pay to use town gas for almost all heating purposes, including large-scale operations. I speak with knowledge when I say that the large user of fuel is as keen to employ town gas as the gas industry is to sell it. It is solely a matter of costs.

The time is opportune for the gas industry to ignore the past and look well ahead, and if found possible to revise the existing system of charging for gas in relation to the present and future possibilities of each class of consumer. The purposes for which gas is used to-day are altogether different from what they were when the present system of rates was introduced.

Some research work is very necessary, such as the testing of refractoriness and conductivity of firebrick material and insulating material, the absorption of heat by different metals and substances, &c. Such research work is already being carried out by those directly interested in the subject. There are other matters, however—one of the most important of which, from a gas undertaking's point of view, is that dealing with water vapour in the products of combustion and the dissociation of water at high temperatures. Very little is known on this subject; and as it influences the atmosphere of all gas-heated chambers, it would pay the industry to spend time and money on solving it. It is well known that, even in the presence of excess gas, town gas will oxidize at high temperatures. Research work on this and similar subjects is not for individual gas companies to undertake, but for a properly equipped Research Department at a University.

With regard to Mr. Creasey's paper, he states that it is difficult to get the right class of men. I have had experience of one or two large industrial departments, and I remember that when I took over my duties in Glasgow, when the industrial load was very small, and they were not catering for anything very large, I felt it was essential to have the best possible man I could get for the work of developing this Department. We had some high-class gasfitters in the Department, and I got hold of a man with whom eventually I was very satisfied. At that time he was maintaining the high-pressure lighting of the City of Glasgow. He was very ingenious in some of his methods, and I appointed him to the position of taking charge of the industrial department. He was there when I left Glasgow, and I believe he is in that same position to-day. We never regretted putting that man there. In appointing him I first of all found out that he was enthusiastic about his job, because that is most essential for any man who takes on the work of developing the industrial business. I consider that a man holding a position in an industrial department should have a grounding in mathematics, because that gives him a logical mind. He should also have a knowledge of constructional drawing, the physical properties of refractory materials, elementary chemistry at least, and mechanics. He should also be capable of designing furnaces, and thus be in a position to criticize any furnaces that may come before him. The man whom I appointed at Glasgow can turn out a drawing of any furnace equal to any draughtsman. Not only this, but he has studied the different processes of the different industries in the city, and that is a most important point, because the industrial load man should be thoroughly conversant with the operations which the furnaces have to carry out. At Sheffield at the present time I am fortunate in having a man of the same calibre. I am proud of that man because I have never known a job put before him in relation to the many industries in Sheffield which he could not tackle—and that is saying a great deal. He is a man full of enthusiasm. He can design furnaces, which is most important, because the manufacturers, although familiar with the duties of a furnace, are not very familiar with the design; and it is up to the man dealing with the industrial load to be able to place designs before even the manufacturers of the furnaces themselves, and show them where improvements may be made. That is the great asset of a demonstration room. We have a demonstration room in Sheffield where we have all classes of furnaces, mostly designed by ourselves; and we are in the position that, if we have a particular job to do, we can design a furnace to overcome any particular difficulty. We can place a rough furnace up in the demonstration room, and get the industrial users to come along and put work into it and try it out. Then we can order a furnace or supply drawings for it. That is the only way in which we can obtain business and at the same time secure the full confidence of the consumer. The man in charge of our industrial department is provided with a motor car which enables him to get about quickly and keep in touch with business. I have received a report from him dated Aug. 30, in which it is stated that a design was submitted for an industrial furnace using town gas where formerly a producer gas-fired furnace was in use; and the consumption is 3000 c.ft. per hour. That furnace is now in operation. Another case referred to in the same report is of a firm which has definitely decided to displace an existing coal-fired furnace and substitute gas for annealing wire, the consumption of the furnace being 6000 c.ft per hour. That furnace is now in operation. Another large firm has installed gas for sheet annealing. The furnace in that case is similar to one used at Messrs. Krupp's in Germany, and it is the first gas-fired furnace manufactured by the particular makers. In another case a producer plant has been shut down, and 150 million c.ft. of gas per annum will be sold to these particular people. There are many more examples I could mention, but I will not trespass on your time. We all know that trade is very bad now all over the country, and Sheffield is having its full share of the depression; but I am pleased to say that, despite this, our night-load from 6 to 12 o'clock, and sometimes industrial load we are getting is adding considerably to our last year's load within 3 p.ct., so it proves conclusively that the industrial load we are getting is adding considerably too our consumption. In order to encourage large consumers I recommended my Board about 12 months ago to sell gas on contract at 1s. per 1000 c.ft. I saw the whole of my large consumers personally, and every one signed an agreement for 12 months at 1s. per 1000 c.ft. Those having a consumption of between 25 million and 100 million c.ft. promised an increase of 15 p.ct. in consumption, and those using over 100 million c.ft. promised an increase of 10 p.ct. This was the only stipulation made for this reduction in the price of gas, and in most cases the increase is being taken. In one or two cases the increase has not been maintained, but this is a matter we shall be able to deal with. I am confident that even in less industrial areas we shall be able to get an industrial load if we look for it by specializing on that side and putting our shoulders to the wheel and seeing that the work is carried out properly.

I have very great pleasure in proposing a hearty vote of thanks to the authors for their valuable papers.

Maximum Service with Minimum Calls.

Mr. H. C. Smith (Tottenham and District Gas Company): We have listened with very great interest this afternoon to two most valuable papers. I should first of all like to congratulate Mr. Copp on introducing so much original thought into his paper on service to the consumer. We have had so many papers during the last few years on service to the consumer, and we had a Conference in London about two years ago called by the Institution of Gas Engineers and the B.C.G.A., where for two or three days we talked of nothing else, so that one really almost thinks it would be quite impossible for anyone to get up here and produce an original paper on the subject. Mr. Copp, however, has done it; and I am sure he has earned our very great thanks. Mr. Copp speaks about pressure and the importance of the consumer having a pressure with minimum variation at his apparatus, and he refers us to a chart which shows how he maintains that even pressure as the load increases. It is a little difficult, however, to realize how these variations at the works will give the consumer an even pressure. Perhaps, if there is time, Mr. Copp will give us a little more information on that point. Later on Mr. Copp refers to

the number of people who have to call on a consumer with reference to the installation of appliances; and I certainly think that is a point to consider carefully. We have to see if we cannot devise methods of getting the same effect as to-day, giving the consumer the same if not better service, without such a large number of calls being necessary. I am perfectly convinced that it is a nuisance to a consumer to have one employee after another going into the house in connection with one or two appliances. At the same time, I do not quite see how we are going to accomplish this desideration until we get a higher grade of man doing the actual work—a man who perhaps in the first instance is qualified to advise the consumer on what he should have, as well as later on to install it. Anyhow, if we can do anything to reduce the number of callers, I am sure we shall earn the gratitude of our consumers. Mr. Copp also gives details of the costs of his maintenance system, but he does not say—or if he does I must have missed it—what he charges the consumer, whether it is a service for which no specific charge is made or whether there is an actual charge. I shall be very glad to know what the position is in that respect. Towards the end of the paper Mr. Copp refers to the difficulty of getting the right type of man for district work. I take it he means for the higher posts on the district; and he rather suggests that undertakings have been trying to obtain the services of men possessing the necessary qualifications but have found it difficult to get them. About seven years ago we started an apprenticeship scheme at Tottenham with the idea of training men to take on the positions which became vacant on the district, such as district representatives and salesmen, district inspectors, &c.; and we found it very difficult to get the right type of man. We only did it, as a matter of fact, by getting the headmasters of the local secondary schools interested in the scheme. Now we always have a waiting list. If we want one or two apprentices for our scheme, if we have two or three vacancies, we have a waiting list of boys who have passed their Matriculation examination, or equivalent examination, who are only too anxious to join the apprenticeship scheme; and we have found this most valuable. The first batch of apprentices who completed their time have been most valuable to us, and they have been put into positions where they are giving us some idea of the advantage we are going to get in the future through having properly trained men.

Industrial Representatives.

Coming to Mr. Creasey's paper, here we have a paper on a subject which we have heard quite a lot about, but it is one upon which Mr. Creasey has had much practical experience. Those portions of his contribution in which he sets out the different processes in which gas is used will be very valuable indeed to those of us who are really only just beginning to tackle the industrial problem. I do not know whether the time is yet ripe, but it has occurred to me, as he was reading his paper—and having in mind the great value we all obtained from that conference on maintenance of appliances and service—that it might be very valuable if in the future we can have a similar conference dealing with the industrial load. If Mr. Creasey's paper had been read 12 months ago I think we should have felt a little guilty at Tottenham, because we had not then really tackled the industrial problem at all seriously. We had certain industrialists who were large users, and if they asked us at any time to advise them we should have been only too pleased to refer them to the makers of gas furnaces. That was about as far as we got; but new industries were coming into the district, and we found that what suited us in the past would not suit us in the future. Therefore, it was necessary for us to study the industrial section, very modestly, I agree, at first. Mr. A. W. Smith, of Birmingham, very kindly took one of our apprentices who had recently completed his time, and let him spend some time in the industrial laboratory at Birmingham. When he came back to us his job was to call on all the industrial users of gas; and if any of you are at all doubtful about the advantages to be gained by entering the industrial section, I should like to assure you that the experience we have had has proved that it is absolutely necessary to send someone to call on these industrial users. You must not imagine, as we did, that practically the whole of the gas in the district can only be used for domestic purposes. We have been astounded at the number of processes in which gas can be used, and in which the manufacturers are willing to listen to someone who can talk to them about the industrial uses of gas. This industrial salesman of ours went into one of the main factories in the district and was very well received. He found that they were just considering the installation of an oil-fired furnace, and he suggested that this was a job which could be done better by gas. He talked to the manufacturer about gas, and eventually got an order for a gas furnace which is now using 1500 c.ft. of gas per hour. In another factory he found eight small muffles heated electrically. One of them had failed, and our industrial salesman suggested to the manufacturer that he should try gas instead. Although we do not profess yet to be able to design elaborate furnaces such as might be designed in Birmingham or by the Gas Light and Coke Company, or by Sheffield or some of the large undertakings where they have a well-established industrial section, at the same time we were able in our own workshops to convert this electrical furnace quite satisfactorily to the use of gas, and the remaining ones are going to be converted. If we had not had our man calling we should not have known they were using electricity or contemplating any change; and that experience is being repeated all over the district to such an extent that I am sure it will not be long before the industrial section will have to be enlarged. I should like to second the vote of thanks proposed by Mr. Halkett.

Importance of Uniform Gas Quality.

Dr. C. M. Walter: I have been particularly interested in the two papers which we have heard this afternoon, and especially in Mr. Creasey's paper owing to my intimate association with gas for industrial purposes. However, Mr. Copp in his paper has made one or two very important suggestions with regard to the quality of gas; and as one who has recently designed automatic controllers for industrial heating plants, I can emphasize the importance of a uniform quality of gas, as regards both calorific value and density, as far as possible, in order that we may get this automatic control to operate within very fine limits. I think I can say that with modern apparatus we have reached a point now when the limit of control depends not on the controlling apparatus but on the variation in the gas supply. I am always out myself for a uniform supply of gas. I would rather have a slightly lower calorific value than a gas which varies from time to time within wide limits.

Value of Practical Experience.

In regard to Mr. Creasey's paper, I think we will all agree that this contains a mass of information of a statistical nature which must be of considerable value to us all. First of all he refers to the type of industrial salesman that is required to deal with these industrial problems; and I can endorse every word he says in regard to the necessity for such men having not only a scientific knowledge of the subject, but practical experience of the apparatus itself and of the processes in connection with which that apparatus has to be used. In my opinion no apology is needed from anyone discussing the question of the industrial use of gas for delving into the mysteries surrounding the application of gas to various heating problems. At a fuel meeting recently a speaker said he would have to apologise for dealing with the actual design of the plant, which normally he would not consider any concern of his; but may I say at once that both the design of the apparatus and the delving into the processes with which that apparatus is to be used have been our work at Birmingham for ten years, and probably constitute the more important task of the industrial salesman. When one considers the large number of processes, which Mr. Creasey has put at well over 3000, in which gas can be used, one at once realizes the difficulty of training men to have an intimate knowledge of these industries. We have had the same difficulty to contend with, and only an hour ago our General Manager made a suggestion to me which is very similar to the one made by Mr. H. C. Smith this afternoon—namely, that we should get into touch with Universities, and try to get the engineering professors to interest students taking engineering courses, so that at a later date the professors might prepare for us a short list of candidates from which we could increase our staff when occasion arose. That is a real difficulty, and one we have all to face.

Need for Far-Reaching Research.

With regard to the method by which assistance is given to industrial users, I am afraid I am not altogether in agreement with Mr. Creasey's views. He mentions that his representatives visit the works and deal with all apparatus in that works, whether it be lighting, ordinary heating, canteen work, or industrial heating. Our own experience in Birmingham is quite different, and points to the fact that we must deal with industrial heating quite separately. We look upon the lighting of a factory as a job entirely apart from the industrial engineer. For the heating of premises we likewise consider that the work should be done by a special department dealing with the heating of buildings. When it comes to industrial work, we shall expect any of our industrial representatives to deal on the spot with any difficulty that crops up, either in connection with the plant itself or in connection with the process in which that plant is used. To give you one example of the far-reaching manner in which a knowledge of processes comes into the question of the industrial load, I should like to quote a particular instance which involved two years' research work in our industrial laboratory on storage battery design, with the ultimate object of bringing a new industry into our city and also getting a considerable increase in gas consumption for melting the white metal used for the grids in connection with the manufacture of accumulator cases. We spent two years in research work on the design of storage batteries, and we brought a new industry to the city, with, incidentally, a very large gas consumption. That is only one example of how far one may have to go in connection with the various processes to bring about an increase of gas consumption.

At this stage the President expressed regret that the discussion must be closed, and he asked for written contributions to the discussion.

Education for Commerce and Industry

By Principal A. E. MORGAN, M.A.,

Principal of University College, Hull.

It was suggested a few weeks ago in "The Times" that the chief need now was not to preach to educationists on their duty towards business, nor to persuade public opinion that commerce was a noble profession, but to induce the masters of business to realize the need of education for the young men they employ. It seems to me rather futile to argue on the relative responsibility of this group or the other. The need is so serious that we must get on with the work of finding a solution to a problem which has to be solved if the country is to flourish.

It goes without saying that various individuals and groups are to blame for a deplorable state of affairs. You remember the case of the business man who was putting some young men through their paces with a view to employment. One he found very difficult; there seemed no point of contact. At last he said to him, "Now I'll ask you a question which any boy in my office could answer; what's the meaning of E. and O.E.?" After a moment of blankness the young fellow replied cheerfully, "Eton versus Old Etonians." And he was not appointed. Now it would be a very foolish man who would ask a question of that kind and a more foolish one who would regard the answer as telling him anything that he really needed to know.

Yet there are undoubtedly many men—I meet them every day myself—who argue against further education for business on the ground that if a young man stays at school until he is eighteen, goes to the university for three years and then enters business, he knows less than a lad perhaps younger than himself, who left school at 14, 15, or 16, and has had several years in business. "He is more useful to me," that employer will say, "and yet this young man from the university who knows nothing of business expects to get a higher salary."

Training for Creative Work.

Undoubtedly the facts are true; it is the deduction that is false. The real question is not which of these two young men is more useful or more costly to-day, but which of them will be the more capable of doing responsible creative work when he is thirty.

That brings me to my point. It is important that industry and commerce should be equipped throughout by servants of the best quality; the whole machinery of business is so much more elaborate than it was even a generation ago that all those who serve it need to be more and more highly trained. But what seems to me to be of especial importance at this juncture is to secure an adequate recruitment of those who in a few years will be the leaders of the business world. It is the supply of the top men that is of prime concern.

Not only is industry becoming technically more complex as regards production, finance, and distribution; it is harassed from all sides by rapidly changing conditions, nationally and internationally. At this very juncture a generation of business men who have suffered exceptionally from the heavy nervous strain of the past fifteen years—a factor by no means to be ignored—realizes that the war has seriously depleted the ranks from which promotions should be made. I am not one of those pessimists who are always ready to ask hopelessly, "Where are the young men?" Yet we cannot blind our eyes to the fact that circumstances have coalesced to create a very serious situation in our time.

On the contrary, I am an optimist; for I believe that the reservoir of man-power and brain-power is there. But it can be utilized only if we take measures that formerly we regarded as unnecessary. I am hopeful because I believe that circumstances are unsealing our eyes, and that we shall now adopt measures already overdue.

What Method Shall We Use?

The question remains: How are we to train for business? What is the precise service to industry and commerce that education must give? That is the problem on which I am going to offer a few comments, fully realizing that I am venturing into an arena where I may quickly be surrounded by angry snarls. I appreciate the difficulties that are in the way of deciding on any clear course of training. In fact, I am convinced that the experiments which have already been made must be followed by more, and that only by a patient process of trial and error shall we achieve anything in the nature of success.

It would be vain in the compass of a short paper to attempt a discussion of the education of all entrants into business. I am concerned at the moment with the upper ranks, with the possibility of improving the training of those who will lead business in the future. Even so, the problem is very large. The needs of business are so multifarious that no single course of training can possibly suit everybody. Think of the vast difference of knowledge and experience necessary for managing (say) a steel works, a public utility service, and a general store.

In the past the various faculties of commerce in our universities, while recognizing the divergence of needs, have sought to discover the common factors and on these to frame a course of general usefulness. All business is but a practical application of economic theory; therefore economics very rightly has played a prominent part in the curricula for commerce degrees. Such subjects as commercial law, modern languages, accountancy, statistics have been been regarded as of common utility, and are generally included. The real difficulty is that when you arrive at the common factor, it is, if not meagre, at least in the main theoretical. The practical knowledge that is wanted in business varies so widely that for the most part it has been found necessary to omit this side.

Practice Combined with Theory.

This is not wholly a bad thing. It cannot be stated too emphatically that no university course ever can or ever should attempt to turn out fully fledged business executives. Take a newly qualified doctor, engineer, or lawyer, who has just left the university. Is he fully fledged? Of course not. He has learned a great deal, but only when he has had the experience of practice can it be said that he is fully qualified.

We may take a useful lesson from these examples. Although the professional man is not fully qualified when he is nominally qualified, he has been put through a good deal of practical work which is of immense importance in his training. No one can get a medical degree without hospital experience. Although anyone who can may take a law degree, only after some years of office work will he be admitted to the roll of practising solicitors. It is well recognized that an engineering degree without shop experience is worth little for professional purposes. If this principle is good for these professions, why not for business? In fact, my own belief is that the solution of this vital problem of education for the higher walks of business is going to be solved on much the same lines as it has been, with undoubted success, for the other professions. In other words, we must have a course of training which combines the theoretical and the practical.

Now the great difficulty is to decide what this practical training is to consist of. It is simple to draw up a practical course for students of medicine or engineering; but what will suit a group of six young men training (say) to go respectively into a locomotive factory, a shipping office, a wholesale provision firm, a large milk business, a screw factory, and chocolate manufacture?

It is quite clear that no university course of training can qualify all these young men to run a business or even to step at once into a position of high responsibility; but I believe a good deal more can be done than is yet done in university commerce courses to give a measure of practical training. In the first place it will be necessary to classify and divide businesses. Engineering courses are classified. While all students take certain preliminary courses in common they soon branch off into their special lines and have distinct courses of training according as they choose to be civil, mechanical, or electrical engineers.

Classifying Business Training.

The classification and division of business training is not so simple; but a first distinction could be made between manufacturing industry and the commerce of the merchant. A third important section is finance. Then there is the commerce which is concerned not so much with salesmanship as with transport, which is another large category of business activity for which specialist training is already on the increase.

If we can make some such division as this—say, industry, merchanting, finance, transport—we have gone a good way towards meeting one of the difficulties. It has been found in practice quite possible to formulate courses of training in transport. There are a few courses in industrial administration in existence. Courses in merchanting, as distinct from industry and transport, though not necessarily excluding them wholly, could then be framed more easily. It may be desirable to subdivide courses still further. Just as a course in mechanical engineering may permit specialization for general, motor, or aeronautical engineers, so courses in merchanting might include options for wholesale or retail trade so far as they have peculiar problems, and special language courses for foreign trade. Already this has been done for the various sections of transport.

This subdivision and specialization has been impossible heretofore in higher commerce courses, if for no other reason be-

cause the universities have not been able to afford it. The total number of students is so small and the supply of teaching staff so meagre that it has been quite impracticable. It is practicable and doubtless would be done if a much larger number of young men came to the universities to train for business.

Obtaining Practical Knowledge.

The next problem is how to get the practical training. In medicine, law, engineering, the regular practice is for the university to give instruction on the more purely scientific and theoretical side, and for the student to go into hospital, a lawyer's office, or an engineering shop for the practical training. In medicine that hospital work is embodied in the university course; for lawyers it is quite outside the purview of the university; in engineering it may or may not be part of the course according to the practice of the particular university. If the universities are going to give a qualification for business executives they must collaborate with business and make arrangements by which students can go into works and offices to see the everyday working of industrial and commercial concerns. This is by no means impracticable and firms are very willing to assist.

There are various ways and degrees in which this can be done. It may be useful to let students pay a visit to a firm so long as they are guided by some one who can show them specifically what they should see or explain its relevance to their training. Mere sightseeing is not likely to be of lasting value. Arrangements should be made for students to go into firms as employees. It is not likely that they will be paid; nor can they expect it. Employment of this kind for a vacation, or, better still, for longer periods, is what is really necessary. Before long I hope we shall see a system of training in which employment in firms is as integral a part as the shop training for engineers. I am not prepared to say whether an end-on or a sandwich system is better. I think experiments should be made with both.

Co-operation between University and Industry.

I am glad to say that several large firms have agreed to co-operate with this College on these lines, and students taking our course in industrial administration will have the chance of being sent by the department for practical demonstration of business methods and procedure. Your firm, the British Gas Light Company, I am glad to say, Mr. Chairman, is one that has kindly consented to help in this way; so also have Messrs. the British Oil and Cake Mills, Ltd., Messrs. G. & T. Earle, Ltd., Messrs. Priestman Bros., Messrs. Reckitt & Sons, Ltd., and Messrs. Rowntree & Co., Ltd., of York.

A hundred years ago doctors were trained as best they might be by a crude system of apprenticeship. That has long been abandoned. The engineers and dentists have followed the doctors; the lawyers and the architects are moving in the same direction. When people talk in high-falutin style of the function of the universities being to propagate knowledge for its own sake, let us remember that the universities came into existence as training schools for the professions. There is no higher function that a university can have than to equip the topmost grades of servant that the community needs to do its most difficult work.

Let us recognize that the service of industry and commerce is one of the most important as well as difficult tasks, and that the nation must have it done well if it is to thrive. I venture to assert that the old system of apprenticeship as an entry to the highest walks of business is quite out of date. We must find a new system, and I claim for the universities the responsibility to play their part in this matter. They cannot do it alone. They must have the advice and the co-operation of industrial and commercial leaders just as medical and law schools have the support of their respective professions. And above all let the universities realize that some measure of practical training must form part of the course.

The universities are thinking about this problem; for a quarter of a century they have been experimenting. They have accomplished a great deal, but there is still more to achieve. Let business men and the universities try to understand the problem better and to gauge how much each can contribute to the solution. Let sympathetic co-operation replace the rather paltry sneers that are too prevalent. Then we may succeed in training young men, and, indeed, young women, to cope with the ever-increasing complexities of business life.

Character or Knowledge?

And one last point. In the discussion that has been kept up for the past year or more in the public Press we have heard often expressed the view that it is character that is fundamental; character *plus* brains say others; and I think some would not bother much about the brains. Gentlemen, surely character is just as important in any walk of life. Do the medical, legal, clerical, and teaching professions not need men of character to do their highest work? Is it more important to have character to make water-tube boilers or to sell stockings, than it is to teach children or to heal the sick? Of course, character is all-important in any and every walk of life. Important though character may be, we would not trust our bodies to the knife of an ill-trained surgeon even if he had the noblest and most forceful character in Christendom. And however able he might be to handle men you would not let your brief be given to a lawyer who did not know the law. Nor I maintain should we trust the precious and delicate economic body of the community to the intellectually unskilled just because they have fine qualities of character.

The day of the amateur is past in every calling. Life is so complex, so highly technical, that only those who are trained in all the complexities and technicalities are able to serve the community in its highest posts. Let industry and education get together and keep together each in a spirit of wishing to serve and learn from the other. At first it may be necessary for industry to expect less and for the universities to give more. We shall then be well on the way to discovering the solution of this problem which most emphatically must be solved.

The Education of Gas Salesmen

By SIR FRANCIS GOODENOUGH, C.B.E.,

Chairman of the Executive of the British Commercial Gas Association.

That there is need for a sound practical scheme for the education and training of those engaged upon the sales and service side of the gas industry requires little argument to-day. It is being asked for in all directions, not only by managers who appreciate the pressing need but—and especially—by the salesmen themselves.

Necessity for a Competent Sales and Service Staff.

The steady increase in the intensity of competition in these days, alike with electricity and with oil; the complete disappearance of the times, which will never return, when an increase in the sale of gas could be relied upon without any serious effort being made to secure it; the obvious need of skilled planning, direction, and execution of continuous selling campaigns and maintenance schemes, necessitate beyond any question the employment by every gas undertaking of staff competent—and adequate—to meet that competition and to carry out such a progressive policy in the most efficient manner possible. Let me stress the word "adequate" as well as competent, for very few undertakings to-day are employing a large enough staff of salesmen to meet present needs.

The securing of an adequate number of competent salesmen involves several important lines of action by gas undertakings of the country, jointly and severally, with which I should like to deal before coming to the details of the scheme which the Executive have prepared for your consideration.

Recruitment of Staff.

Every undertaking needs to give, as some already do give, careful thought to the sources from which its staff of all ranks on the commercial side shall be recruited, and to have some definite plan of recruitment. This is desirable in order to ensure the engagement or promotion of only those who have (1) the character and personality that will suit them for dealing with consumers, either directly or indirectly, as in correspondence or on the telephone; (2) the general knowledge, intelligence, and ability that make it easy to acquire; (3) the information and skill required to make them competent salesmen in the wide—as well as the narrower—sense of the term. We cannot afford to-day to be haphazard in our methods of recruiting our commercial staff, for we must have the very best we can afford.

Points that are of prime importance in this work of selecting the commercial staff are, I am sure you will all agree, strong but agreeable personality with a genuine anxiety to please; good appearance and carriage; and the ability not only to write English accurately, but to speak it clearly and acceptably. Instruction both in deportment and in elocution would greatly improve many a promising candidate for employment in a showroom or on the district.

The selection of recruits for the commercial staff on some definite plan, based upon suitable general education, with the object of improving the quality of the sales and service staff of the industry, is a matter deserving very careful consideration by us all.

It is perhaps worth mentioning that the Local Education Authority in every district will readily co-operate with employers by giving them information as to all the types and grades of schools in their area, and the attainments and apti-

tudes of the types of scholars passing out of them. There have been developments in recent years in the provision of Secondary Education of which many of us, in common with other employers, are unaware. Much interesting information as to these developments is contained in a publication by the Board of Education, entitled "Education for Industry and Commerce," which can be obtained through any bookseller for sixpence.

Subsequent Education and Training.

The next important step is to see that all recruits, as well as all existing members of staff, are properly educated and trained—(*a*) to make them more competent to fulfil their present duties; and (*b*) to fit them, where possible, for promotion to more important work.

This is a matter partly for education designed to increase their knowledge, both general and special, and to develop their powers of thought and judgment; and partly for training in the art of applying their knowledge, intelligence, and wisdom to the daily work of selling to customers and rendering satisfactory service to them.

The special education necessary and the training required to make good recruits into good gas salesmen are the matters with which this paper is concerned, and will now be dealt with. They concern gas undertakings individually and collectively, but before passing to their consideration, there is a third general point to be mentioned and emphasized.

Pay and Prospects.

Suitable recruits, suitably educated in the science and trained in the art of commerce as applied to the gas industry, must be adequately paid and given inviting prospects of promotion if the right types of recruits are to be attracted to and retained in the industry, as it is imperative they should be if the industry is to maintain itself and to make progress in the teeth of the competition of to-day and, still more, of to-morrow.

Those of you who are already choosing, training, and paying your commercial staff carefully, thoroughly, and adequately must please forgive my stressing these points before coming to the question of what the industry should do collectively in this matter of the Education of the Salesman; because there are still some managers and some administrators of gas undertakings who are not fully convinced of the vital importance of skilled personnel to the future of the industry.

I want to say to them, with all the earnestness of which I am capable, that the progress—I would go so far as to say the existence—of the gas industry during the next twenty years depends largely upon our realizing to-day the imperative need of modern methods and modern men for the conduct of our undertakings as commercial organizations. Unless we employ the best weapons we shall perish in the fight that lies before us—is, indeed, already upon us. Competition can only be countered by efficiency, and you cannot be efficient unless your staff is efficient. It has been well said that those who do not value trained intelligence are doomed. This is true alike of the nation, faced with keener and keener foreign competition, and of the gas industry, faced with Government-fostered competition that daily grows in intensity.

To turn now to the practical consideration of the problem which has been engaging the minds of the Executive for some considerable time, indeed throughout the development of the Education Scheme of the Institution of Gas Engineers. That Scheme, indeed, on its Gas Supply side, forms an essential part of a complete scheme for the education of the commercial staff. The time has now come for providing the supplement to the Institution Scheme which will meet the needs of the salesman.

Realizing this to the full, the Executive in July last appointed a special Committee to consider the question, and as the result of that Committee's report are recommending to the General Committee a scheme which I am glad of an opportunity of describing at this Conference, so that we may get the advantage of members' views upon it before it is put into its final form. We shall also be putting it shortly before a Conference of representatives of the Salesmen's Circles and of teachers in Gas Supply, so as to have the benefit of their experience and advice.

The Problem.

The problem of commercial education for the gas industry—that is, education for gas salesmanship in its broadest as well as more narrow aspect—is a threefold one, embracing:

(A) General Education—for the development of the student's intelligence and for ensuring activity of thought, receptivity to ideas, and the capacity to speak and write correctly and acceptably:

(B) Knowledge of the Particular Business and of the Commodity to be sold—including

(*a*) a sound elementary knowledge of the manufacture and distribution of gas;
(*b*) a more advanced knowledge of the utilization of gas, including knowledge of the construction and uses of fittings and appliances, their installation and maintenance;
(*c*) a broad knowledge of the history of the industry, of the statutes governing its operations, and of the law as between undertaking and consumer, including powers and methods of charge; and
(*d*) an understanding of such subjects as the relation of the industry to smoke abatement, public health, coal conservation, and other national problems.

(C) Training in the Science and Art of Selling—to enable the student to become expert in securing and maintaining the goodwill of the customer. This would include instruction in and study and discussion of

(*a*) the principles underlying sound commercial policy;
(*b*) the analysis of the selling field as a basis for selling effort;
(*c*) the right (and wrong) arguments on behalf of every possible use of gas by every class of consumer, and the right (and wrong) way of presenting those arguments;
(*d*) how to meet arguments and prejudices against gas;
(*e*) how to deal with every aspect of gas service to every class of consumer—including the handling of correspondence, disputed accounts, complaints, and other possible disagreements between undertaking and consumer—all directed to the end of securing the maximum amount of permanent business;
(*f*) the presentation of the case for gas to architects, builders, consulting engineers, doctors, public health workers, and other persons having influence on public opinion;
(*g*) the presentation of the case for gas by advertisement, canvassing letter, and all the various methods of publicity; and
(*h*) showroom equipment and management.

I. General Education.

Employers who take a broad and long view of the value to their undertaking of the continued intellectual development of their adult staff take all the practicable steps they can, without appearing either to dictate to individuals or to interfere with their personal inclinations, to encourage studies or social activities that make for such development. Classes or lectures in English Literature, Economics, History, and the Arts, as well as most of the Sciences (general as well as those of specific application to the industry) are obtainable in every area up to quite a high standard, and instruction in education is also available in many districts.

Facilities afforded for attending approved classes or lectures; assistance given in suitable cases in the payment of fees; and interest shown in the progress made by students are always greatly appreciated by the staff and lead to a marked increase in their value to their employers and the establishment of a higher *esprit de corps*.

The ready and willing co-operation of the local education authority can be relied upon in all matters concerning the general education of employees. Frequent contact between employers and the local education authorities—such as already exists in some districts, but not by any means in all—is very desirable, as tending to ensure that education is planned and conducted with a view to combining practical utility with cultural value.

II. Knowledge of the Business.

Assuming that there is a candidate of suitable character and personality, whose intelligence has been developed and his mind furnished through a sound general education, or who is being helped and guided in the right way to make good the deficiencies of his early education, the next important step towards making him a first-class gas salesman is to see that he understands sufficient of the commodity and service he has to sell and of the business in which he is engaged to enable him to talk interestingly, but not too technically, to consumers; to answer any questions that may be put to him; and to state the case for gas for any purpose accurately.

This side of the salesman's education divides itself into:

(1) acquiring the necessary degree of technical knowledge;
(2) acquiring the necessary amount of knowledge of the industry as a public utility.

(*a*) Technical Knowledge.

Many of those engaged in the commercial service of the industry have already acquired some, in many cases a sufficient, degree of the technical knowledge necessary for gas salesmanship, either through technical institutions or by private study, and have given proof of possessing that knowledge by obtaining certificates from the Institution of Gas Engineers. Claims for exemption from such employees from further examination in technical subjects under the scheme for Education of Gas Salesmen which it is proposed to set up would be given full consideration, regard being had especially to the age, experience, and individual needs of the candidate.

In addition to the possession of certificates testifying to their technical knowledge, it is highly desirable that candidates for certification as gas salesmen should also be able to adduce proof of a period of practical training in gas fitting and on the district, and this point will receive full consideration in the drawing-up of the scheme in detail.

For the purpose of advising students on the commercial side as to the course to pursue in order to acquire the appropriate degree of technical knowledge, and for the purpose of considering claims for exemption from further study and examina-

tion on the technical side, it will perhaps be useful to divide them into several categories.

(i.) First there are those who may enter the industry direct on the completion of a good general education at the age of (say) 17 and upwards—and the more there are of them in the future the better. To them the entire ladder of promotion up to positions of managerial responsibility and commercial administration is open, including in its rungs positions in the showroom; in the office on its consumer-contact side; on the district as canvasser, inspector, or special commercial or industrial representative; in the management as showroom manager, district manager, or distribution superintendent.

These young men should certainly be advised to take the Institution Gas Supply Course right through to the higher grade if they want to become first-class salesmen. They should also be advised to continue their general education on lines that would help to develop their powers of original thought and any special scientific, literary, or artistic abilities they possess. All three of such talents are useful in a commercial career.

The Executive propose that a recommendation should be made to the Gas Education Committee that there should be a modification, not of the syllabus of the Gas Supply Course, but of the stress laid alike by the teachers and the examiners upon the more technical side of Gas Supply, so that less attention be paid than now to the details of the work of the distributing engineer—main-laying and service work beyond a general knowledge of them—and so that the whole subject should be dealt with more from the historical and commercial viewpoint than from the strictly technical.

It is also proposed to recommend that to the syllabus of Gas Supply in both grades there should be added a section dealing with the "Economics of Gas Supply." This would cover the history of the industry, the statutes governing its operations and especially its relations with consumers, including powers and methods of charge, and the relation of the industry to smoke abatement, public health, coal conservation, and other national problems.

Further, it is proposed to recommend that the syllabus of the Higher Grade should be divided into four sections—I. Distribution Engineering; II. Economics of Gas Supply (see above); III. Domestic Uses; IV. Industrial Uses—and that Certificates should be granted by the Institution in Gas Supply (Distribution) to students taking I. and II. and by the Association in Gas Supply (Utilization) to students taking either II. and III. or II. and IV.

(ii.) Similar advice to those in category (i.) should be given to those who, having had a sound general education, enter the industry at a somewhat later age after business experience elsewhere, or, having entered on the clerical or craftsmanship sides, discover presently a desire to take up the commercial side. This advice would be subject to the employee being not too old (say, not more than 27 years of age) to take such a course with advantage.

(iii.) There are next—in addition to some students beyond the age limit in (i.)—those who have entered the industry as craftsmen, or have reached that standing after starting in a lower grade, and whose schooling was carried beyond the elementary stage through their proceeding at the age of 11-12 to a central or senior school and remaining until 15 or 16.

They, on developing a desire, or being selected as appearing suitable, for transfer to the commercial staff, should be advised to take either (*a*) the Gas Supply Course so far as their abilities will carry them under suitable tuition, or (*b*) a course in Gas Sales Commercial Practice from which they can afterwards transfer to the full course in Gas Supply if they develop sufficiently. The Gas Sales Commercial Course would include elementary instruction in the Economics of Gas Supply as proposed for inclusion in the Gas Supply (Ordinary) Syllabus.

The choice for them between the Gas Supply Course and the Gas Sales Commercial Practice Course would be determined partly having regard to their ambitions and partly having regard to their age and intellectual capacity. This would be a proper subject of discussion between employer and student.

(iv.) There are other craftsmen whose general education never went beyond the elementary stage but who by subsequent study and attendance at evening classes have developed somewhat late in life and show an aptitude for salesmanship in their relation with consumers or are ambitious for advancement.

For these, and also for

(v.) Clerks or other employees over (say) 27 years of age who develop their desire to be trained for salesmen's work, the Gas Supply Commercial Practice Course—with appropriate concurrent general education as may be necessary—would represent in almost every case the maximum of technical education that could be given with advantage.

(*b*) Knowledge of the Industry.

For all the five categories of employees set out above, instruction is very desirable—either elementary, advanced, or of diploma standard—in the industry as a public utility. This it is proposed should be included in the Gas Sales Commercial and the Gas Supply Courses; but it might also be taught as a separate subject, as might also the Economics of Gas Supply, and be taken with advantage by students who have already obtained Gas Supply Certificates.

This could undoubtedly be arranged at recognized educational institutions throughout the country; or on the premises of the gas undertakings themselves, with or without the co-operation of the Local Education Authority; or by correspondence for students in outlying areas or for those who through the exigencies of seasonal work find it difficult or impossible to attend classes or lectures. The active co-operation of gas managers or the officers of the British Commercial Gas Association with the Local Education Authorities or any approved organization undertaking this work would be essential, and without doubt would be forthcoming.

Training in the Science and Art of Selling.

In the education of its commercial staff the gas industry as an organized body (as distinct from individual undertakings who may have schemes of their own) has not so far gone beyond (1) providing the Scheme of the Institution of Gas Engineers for the teaching of, principally, the technics of Gas Supply (modifications of which are now proposed as above) and (2) organizing through the British Commercial Gas Association the Salesmen's Circles for the discussion of selling problems.

How to Sell.

Valuable as both these schemes are, and still more valuable as the modifications proposed would make them, neither of them provides what is undoubtedly much wanted—namely, a thorough plan and organization for teaching the individual how to make use of his general and technical knowledge in the actual business of securing orders or maintaining the goodwill of present customers; in brief, how to sell.

An employee completely equipped with scientific knowledge and technical skill, with general information respecting the history and policy of the industry, and with accurate statistics as to the relative costs of gas and electricity, is useless as a salesman unless he knows how to use those tools on the job—the job of pleasing and persuading the customer.

Gas managers throughout the country feel the lack of and need for organized means for imparting that knowledge or art to their staffs—not only to the showroom staff and to those engaged directly in getting business from the customer, but to all who come into contact with the public and have opportunities for pleasing (or displeasing) and persuading (or antagonizing) them—and no greater service can be rendered today than that of providing such means in an acceptable way and at reasonable cost.

Accordingly a scheme has been drawn up for conducting a training course in the Art of Selling Gas (Domestic) which may be summarized as follows:

A staff of experts skilled in the preparation of such courses would first carry out, from a third-party unbiassed standpoint, but having particular regard to the customer's non-technical and self-interested point of view, a thorough investigation (*a*) of all the problems connected with the persuasion of the customer to use gas for each of the various purposes for which it can be used, advantageously to the customer, in all the various types of homes or places of business in the country; and (*b*) of the points of dispute that arise between customer and undertaking in connection with the use of gas which may imperil the goodwill of the customer.

This they would do (1) by interviewing the members of the Committee and other representative executive officers of gas undertakings of various sizes, locations, and ownerships; (2) by interviewing experienced showroom attendants and other gas salesmen in various districts; (3) by paying "shopping" visits to various showrooms both gas and electrical; (4) by paying visits to gas consumers; (5) by spending time in showrooms, at the counter, or on the district of various undertakings in company with their officers; and (6) by interviewing the makers of appliances.

The information so obtained would then be analyzed, classified, and tabulated for full discussion with the Committee before being utilized as the basis for the proposed course of instruction.

The course—to be known as the Gas Salesmen's Training Course, being designed to instruct the salesman on how to, and how not to, deal with all the many problems involved—would then be drafted, submitted to, and discussed with the Committee.

The course would consist of (1) text-books to be issued to students, one each month for six months; (2) manuals for the conduct of group meetings for discussions and demonstrations arising out of the subject matter of each text-book at monthly meetings to be organized either by the Salesmen's Circles or by individual undertakings.

Each text-book would conclude with a problem (involving a number of questions) to be solved by the student, whose answers would be corrected, graded, and carefully criticized. Students satisfactorily completing the course would be awarded certificates by the British Commercial Gas Association.

Of the points previously set out and here repeated for convenience—namely,

(*a*) the principles underlying sound commercial policy;
(*b*) the analysis of the selling field as a basis for selling effort;
(*c*) the right (and wrong) arguments on behalf of every possible use of gas by every class of consumer, and the right (and wrong) way of presenting those arguments;
(*d*) how to meet arguments and prejudices against gas;
(*e*) how to deal with every aspect of gas service to every class of consumer—including the handling of correspondence, disputed accounts, complaints, and other possible disagreements between undertaking and consumer—all directed to the end of securing the maximum amount of permanent business;
(*f*) the presentation of the case for gas to architects, builders, consulting engineers, doctors, public health workers, and other persons having influence on public opinion;
(*g*) the presentation of the case for gas by advertisement, canvassing letter, and all the various methods of publicity; and
(*h*) showroom equipment and management—

sub-sections (*a*) to (*e*) would be covered by the proposed Training Course. The other sub-divisions (*f*), (*g*), and (*h*) would be covered partly by the Course and partly by addresses to or papers read at Gas Salesmen's Circles; by visits of students to showrooms, and by articles in the B.C.G.A. "Bulletin." So must, to some extent, sub-section (*a*) be treated. I am hoping to prepare a text-book dealing with "The Principles underlying sound Commercial Policy" as soon as possible after the Government Committee of which I am Chairman has completed its work.

The Association are fortunate in being in the position of being able to engage the services of Mr. Harold Whitehead and his staff to plan and execute, under the direction of the Association's Education Sub-Committee, a Gas Salesmen's Training Course such as I have now very briefly sketched, and you will have the opportunity this morning of hearing from Mr. Whitehead a fuller account of the scheme that is in contemplation. Mr. Whitehead played a leading part in planning and putting into working order a similar scheme for the American Gas Association which has been a great success. As an Englishman born and bred, he knows well that British salesmen need British methods and British ideas; and the scheme which the British Commercial Gas Association hope to launch at the end of this year, after fullest consultation with all concerned, will be essentially and entirely British in design and in construction.

It only remains to set out proposals for the granting of certificates in Salesmanship by this Association, and the following are our proposals, subject in all cases to the production of evidence of adequate practical experience:

A Gas Salesman's Elementary Certificate to be granted to students who pass the examination in Gas Sales Commercial Practice and secure a certificate in the Gas Salesmen's Training Course.

A Gas Salesman's Ordinary Certificate to be awarded to those who obtain an Ordinary Certificate in Gas Supply and a First-Class Certificate in the Gas Salesmen's Training Course.

A Gas Salesman's Higher Certificate to be awarded to those who obtain a Higher Certificate in Gas Supply and a First-Class Certificate with Distinction in the Gas Salesmen's Training Course and who pass an oral examination in Salesmanship.

A Gas Salesman's Diploma to be awarded to those who hold a Gas Salesman's Higher Certificate, submit a suitable original thesis on some aspect of Gas Salesmanship, and pass an advanced oral examination.

I hope that the Executive will soon be authorized to take all necessary steps to put into working order a scheme for the Education of Salesmen on the lines laid down generally in this paper, which I will conclude by once again emphasizing the urgency of the problem and its vital importance to the progress and prosperity of the gas industry.

The Education of the Gas Salesman

By Mr. HAROLD WHITEHEAD

Before discussing the topic assigned to me—the Education of Gas Salesmen—it seems to me proper to supply a brief background to it.

The complete success of any staff training programme presupposes certain factors, and any training programme must be built with these factors in mind. In presenting these factors I do not wish to imply that they are not already appreciated and applied by all member undertakings of the B.C.G.A.; but it seems to me desirable that they should be kept in mind in connection with the question of the education of the gas salesman which I am to present.

To begin with, the success of a training programme is dependent, to a big extent, on the calibre of the men to be trained. And from what I have been privileged to see so far, the gas salesmen compare most favourably with salesmen in other lines. In addition to present salesmen, however, there is the question of building for the future. Personnel selection and preliminary training are the assurance for the maintenance, and even improvement of the calibre of men employed in selling domestic—or industrial—gas appliances. When the right men are secured they must work to definite sales plans, and under able, definite, and inspiring leadership.

Of course, the appliances to be sold must be so constructed as to give positive and satisfactory service. Proper installation and inspection will then round out a service which will increase the customers' goodwill and add pleasantly to the gas load. When I use the word "sell" in relation to gas appliances I intend the word to include sale by instalment or the simple hire of appliances, as well as sale for cash.

Let us then assume a sound policy of personnel selection, preliminary training, constructive and inspiring leadership, and effective appliances properly fitted and inspected. We must further assume adequate sales help in the way of demonstrations and displays, of letters, folders, booklets, and newspaper advertising—the ammunition which makes more effective the work of the salesman. Then we are in a position to consider the education of the gas salesman.

Benefits of Training.

If education is to be effective, the salesman must be fully receptive to it. And what makes a man eager to benefit by training is the benefit to him which comes from it.

It is generally agreed that most men work for three definite things, and in the following order:

First, a permanent position with a regular and certain income.

Second, working conditions which satisfy his ego.

Third, opportunity for increased income.

Gas undertakings generally give the salesman this first and major requirement. Yet a sure position does not of itself develop initiative or encourage hard work. The other two requirements are doubtless supplied by most undertakings.

The salesman can be stimulated to do his best if he is treated with consideration, encouraged to work consistently, and to think and act creatively. The man whose sense of personal pride and well-being is appealed to and who does not suffer the snubs and the unreasonable control which develops an inferiority complex can be counted on to get results which driving cannot begin to obtain.

If to this is added the third thing—opportunity for increased income—every salesman worth his salt will give the best he has in him.

I realize the difficulty of income adjustments in any enterprise which is controlled either directly or indirectly by municipal authorities; yet opportunities for advancement are possible even in the most strictly controlled gas undertakings Let me, however, dismiss consideration of the factors which help to make education productive, and confine the remainder of my remarks to my assigned topic.

The purpose of staff sales training is to help the gas salesman to sell more appliances which by their regular and satisfactory use build up public goodwill and increase the gas load. Education means the development of—the drawing out of—qualities of mind and conduct; but before they can be drawn out, something must be put in. This indicates clearly that education for the gas salesman must have two phases—putting in and drawing out. If what is to be drawn out is to be practical and resultful, what is put in must also be practical and based on actual conditions.

If you accept these premises as sound, we are in a position to consider what a sales training course should contain, how it should be built, and how it should be conducted.

Programme of Sales Course.

To begin with, then, the course should contain a co-ordination of the best sales practices which are proving successful to-day.

Over long or short periods of time every gas salesman develops certain selling habits, certain sales technique. Some of it might be very bad, some of it is excellent. And the success of the salesman is in the same ratio as are his good sales

tactics to his bad ones. Now, if he substitutes good sales procedures for bad ones, the salesman becomes immeasurably more successful; and what is worth noting, he does his work with less effort and with a lot more satisfaction.

It is sometimes thought that a sales training programme can be built up by one man. But I submit this is not so. If a man is unusually clever at selling, he will recommend a process of selling suited to himself, but which will be hopeless for the less gifted person. Again, no man can know what is the *best* way for others to sell a specific article when he limits himself to his own experience. Certainly, no one can sit at a desk and prepare a sales training course that is worth having. It needs actual experience in the field—the consolidated experience of the men who are already *doing* it. Therefore, one-man "systems" are useless; they are too theoretical—too general—to be of more value than as a mental stimulus.

In building up the sales training course, therefore, we first gather all the facts we can—notice I say *facts*—relating to what is being said and done in the selling of gas appliances. We gather this information in several ways. Carefully instructed men and women visit showrooms as shoppers. They note accurately what the salesman says and does, particularly observing the good things. I would like to emphasize that we are interested in hunting for sound, practical sales methods, and have little concern with the indifferent or ineffective.

These shopping experiences are conducted by a number of people of varying age and temperament so as to ensure a fair and complete picture of gas selling as it is actually conducted. In addition to this, the heads of selected gas undertakings are interviewed, and the benefit of their ideas is secured. Further, when an unusually clever salesman is discovered he is interviewed and observed, if permitted, so that the benefit of his skill can be had for all the men who help to make up the army of gas salesmen. Makers of all kinds of gas appliances are interviewed for their ideas and practical suggestions. Gas consumers are talked with so that the view-point of the customer is secured.

It can be seen, then, that we gather together the best selling ideas and selling methods of the whole industry. A big task, as you may imagine, yet one that is essential if we are to prepare a sales training course that is specifically for the use of gas salesmen and which is built on proved selling methods.

All this mass of splendid material is then carefully consolidated and classified, and definite conclusions are made. Sales ideas are compared with other sales ideas, and properly evaluated. And the work is not—cannot—be done by amateurs, for it requires a background of selling experience and sales judgment as well as trained, educated minds to get the most value for this material.

When the work is done, a definite outline is made of the course. And then a most important step is taken. The detailed recommendations are submitted for consideration, criticism, and—finally—approval, to the Committee of gas sales executives appointed by the B.C.G.A. for this purpose.

I should like to emphasize that this sales training course is the B.C.G.A. course in domestic gas salesmanship. Every word contained in it, every suggestion made, is scrutinized and approved by the Special Committee appointed for this purpose.

Method of Training.

You may recall that I spoke of two phases of education—putting in and drawing out. You may be interested in the method of doing this. The plans and procedure for selling domestic gas appliances are printed in a series of six units. These units are posted one a month to every subscriber, who then has opportunity to study them. Thus we have the "putting in," as it were.

The "drawing out" is accomplished by several means. At the end of each Unit is a Sales Case. This Sales Case is really a complete selling experience. Some parts of the Sales Case are good, some poor. The subscriber analyzes the Sales Case in the light of what he has studied in the Unit, he applies the newly acquired information and the freshly presented facts with which he may have been familiar, to that particular Sales Case. He has to do some original and constructive thinking. The drawing out process is started.

May I digress for a moment? We know that most salesmen dislike having much writing to do—and gas salesmen are no different from others in this matter. Instead of requiring long written answers, we supply a number of answers to each question asked, so that the salesman has merely to put a cross on the answer he believes correct. These answers are so planned that a careful study of the Unit is necessary for a correct answer. Thus we ensure the maximum of constructive thinking for the minimum of writing.

The subscriber posts his marked papers to our offices, where they are graded. If the subscriber adds comments or asks questions, he receives a letter from the service manager for the B.C.G.A. course. In addition, he gets an analysis of the Sales Case which enables him to clear up in his mind any possible mistakes in answering that he has made.

The next step in the drawing out process is a series of meetings of the men. We are not strong believers in so-called lectures—they consist of too much putting in and not enough drawing out. We urge every gas undertaking to appoint a group leader who will lead the meetings of its own salesmen. To aid the group leader we provide carefully outlined programmes so that all the leader has to do is to follow the suggestions to ensure a successful meeting.

Instead of the leader giving information, he asks questions and encourages discussion—the drawing out process is carried a step further. When the salesmen are accustomed to hearing themselves speak and the quite natural diffidence at speaking before several other gas men has worn off, another step is made in the development of a practical selling technique. The group leader calls for demonstrations of the selling methods—so the salesmen then learn to *do* what they have read about.

A further step is made when salesmen are asked to try out in the showroom or at the home certain of the sales methods they first read, then discussed, and then demonstrated. As the men are asked to report at a later meeting the success they had in this, the selling procedure is carried into actual use in getting business. Better selling technique thus becomes a matter of habit through repetition.

This combination of printed Units, Sales Cases, and Meetings makes it possible to carry specialization to a fine point. The group leader is supplied with the necessary material to enable him to specialize on any particular gas appliance in which his undertaking is interested at that time.

Further, the meeting manual is so flexibly planned that a group of thirty or more, or only two or three, may have successful meetings.

All subscribers who successfully complete the course are awarded a special B.C.G.A. certificate. This evidence of a good job well done must be a source of personal satisfaction to every subscriber earning it.

You may have noticed that I have said nothing about the need for better selling. The need is so obvious that to discuss it would be merely arguing on something which you have already accepted.

The Human Element in Selling.

But there is a side to better selling that is sometimes overlooked in the appreciation of the increased gas load, which follows it. There is an intense human value to better selling. Better selling is the strongest builder of goodwill, for better selling is more intelligent selling. The gas salesman really becomes an assistant buyer—he assists his customers to buy that which is best suited to their needs, and will therefore help build up that friendliness and goodwill between the undertaking and its customers that is the best insurance for continued and increased prosperity.

And, of equal importance in its way, the salesmen themselves become better men as well as better salesmen. They get the joy of accomplishment out of their work; they get a larger quota of happiness out of their work; they learn to live and to enjoy life more than ever while making a living.

I submit, then, that this sales training programme will increase the sales of gas appliances and therefore increase the gas load. And while doing that, it will develop a co-ordination of selling method that will make stronger sales organizations, dedicated to the welfare of B.C.G.A. gas undertakings and the public they serve.

Gas as a Public Service from the Municipal Point of View

What the Gas Industry does for Municipalities and what Municipalities can do for the Gas Industry

By Alderman J. H. LLOYD, J.P., M.A.,

Chairman of the City of Birmingham Gas Committee.

Introduction.

In the past, one of the principal reasons for corporations acquiring gas undertakings has been to render assistance to the rates or to provide amenities which would not otherwise be obtained.

But now that Parliament—with the object of ensuring that the users have the advantage of the public service at the very lowest possible price—sets its face against contributions to the rates, there is little difference to the community whether the supply of gas is controlled by a corporation or by a company, so long as the best possible service is given at the lowest possible price.

When both the gas and electricity supplies are owned by a municipality, one may reasonably assume there is a " fair field and no favour " for either commodity. There is a keen and wholesome rivalry between them; both strive to give the greatest possible advantage at the lowest cost, and the consumers and ratepayers get the best service and lowest price consistent with maintenance of quality.

There is no reason why the same happy state of affairs should not exist between a company-owned undertaking and its surrounding local authorities. There have recently, however, been signs that in some quarters this is rendered difficult by the existence of false notions as to the position and value of the gas industry, and it is the object of this paper to record the progress of the industry in the past; its present position, and future prospects, and—by a plain statement of facts—to give some indication of the value of the industry to the country, to the municipality, and to the individual citizen.

Since the politicians have adopted electricity, and have vied with each other in fostering its growth, sometimes with slight regard to economics, some people have an altogether exaggerated idea of the possibilities of electricity, and a correspondingly depreciated idea of the services of gas.

Gas and Electricity Compared.

The essential point to bear in mind is that there is a place for both methods of utilizing our coal resources in the service of the community. There is no question, and never can be any question, of either replacing the other and fulfilling all the services of both. This is well illustrated by the fact that gas is so useful as a fuel that all the great electric lamp and appliance makers are enormous users of gas, just as many gas-works are large users of electricity for power purposes.

There has, however, been so much talk in recent years in Parliament and out of it, in season and out of season, as to what electricity is *going to do* for this country, *somehow, some day*, and, moreover, electricity actually is such a wonderful and mysterious form of energy, that not a few have lost a grip of facts and their sense of proportion and of possibilities, and are talking as if electricity were about to displace all other forms of energy, and as if the day of gas as a great public servant were drawing to a close.

That is a fundamental misunderstanding of the facts and probabilities, and one that may easily mislead public administrators, as well as private citizens, into costly errors, which may cost much trouble as well as money to correct. It may, therefore, be of service to present briefly, for consideration, some of the vital facts governing the situation to-day, and the probabilities of the future.

The central vital fact to remember is that coal, for all practical purposes, is our only native source of energy and heat. We have no adequate sources of water power. We have no Niagara, no Swiss or Italian or Scandinavian water falls. We have no oil fields. In short, we have no alternative to coal worth taking into consideration.

Now there are only two economical methods of making available the latent energy of coal; either

(*a*) by burning it to produce steam (raised either by crude coal or by coke), which may be used directly or used to drive dynamos to generate electricity, or

(*b*) by distilling it to form gas and coke which are then burnt.

Gas and electricity are merely alternative forms of the potential light, heat, and power in coal which can be conveyed to the user free of labour, of storage, and of dirt, and make no smoke in their utilization. They can be distributed and controlled with ease. Between them, they have largely revolutionized, and will still further revolutionize, conditions of labour, and the whole process of production in our workshops and factories; the state of the atmosphere in our towns and cities; and the daily work in our homes.

Manufacturing Comparisons.

Enormous advances have been made in both electric and gas lighting in recent years; but in both cases we are still low in the scale of efficiency; and it is no doubt the fact that such strides have been made in developing the efficiency of electricity as a lighting agent that has led many people to expect that sooner or later there will be a corresponding advance in its efficiency as a source of heat. On this completely unfounded belief are based hopes that are doomed to disappointment.

A unit of electrical energy or a therm of gas has its precise equivalent in heat, and no invention can ever get more than that out of it. The heat equivalent of a unit of electricity is only about one-thirtieth of that of a therm of gas.

Please do not misunderstand me. I am making no attempt to belittle the service of electricity to the community. That would be an act of folly. Electricity is a powerful and valuable servant of mankind. Its wonders are continually growing, and its possibilities are as yet but very partially explored. In spite of our familiarity with them we can still marvel at the telegraph, telephone, and the wireless in our daily life; at the X-ray, at the Finsen light and the other applications of electricity to medical work. We recognize the value of electricity at every turn; to railways and tramways; to shipping and industry; but do not let recognition of its advantages and its possibilities blind us to the facts which, in some directions, impose insuperable limitations upon its use.

The most efficient electrical generating plant in existence has a thermal efficiency approximating 35 p.ct., and this only in the case of very large units working at an exceedingly high load factor, whereas the most modern gas-works plant has a thermal efficiency of over 85 p.ct. including gas, coke, and tar. In other words, in electrical generation of the most efficient order, 65 p.ct. of the potential heat energy of the coal is lost, whereas in modern gas-works plant only 15 p.ct. is lost.

Apart from this question of coal conservation, the use of gas has many advantages not possessed by electricity. Gas can be regulated as to the measure of heat to be given in cooker or fire more easily and more economically than electricity. Gas fires, because they must be ventilated as must a coal fire, ventilate the rooms in which they are used—a most important hygienic consideration. Electric radiators, on the other hand, do not ventilate and are actually the cause of some builders omitting flues from living rooms—a practice which is hygienically to be condemned, and physically objectionable.

May I express the hope that this very cursory examination of the facts may be of some help in preventing waste of time and money. It is surely wiser to borrow experience than to buy it.

Let us consider how these and other arguments are borne out in practice by considering the present position and future prospects of the gas industry.

Gas Industry not Dying.

Efforts are continually being made in the Press and in other directions to suggest that the gas industry has passed its prime, that gas is an old and therefore a dying industry. There is no justification for associating age with decay in industry—the age of an industry and its vitality are in no way interdependent.

We do not assume that because aeroplanes are now a practical proposition we should cease from using ships. Likewise the advent of electricity has not sounded the death-knell of the gas industry. They are both, in fact, very active in their service to the nation.

The gas industry of this country is pre-eminently a British industry. It is financed by British capital and run by British brains. It represents £180,000,000 of British money, and has 113,000 workmen on its pay roll. When we read of foreign capitalists endeavouring to obtain control of our industries, this fact alone should lead us to think well of the gas industry.

Service Policy.

The late Sir Corbet Woodall, when President of this Association in 1912, laid down a rule of conduct for members which expresses in very few words what is behind the policy of every

up-to-date gas undertaking to-day. His words have been often quoted, but will bear repetition; they were:

> Whether you are a sliding-scale company, or a maximum dividend company, or a municipal undertaking, the public rights you possess impose on you a public duty—that of supplying gas in your district at the lowest possible price consonant with your other obligations.

In other words, our industry recognizes that gas is a public servant. It is for the public to say whether the servant is worth his wages. The best answer to this question is the fact that practically every householder in an area of supply is using gas for some purpose. Add to this the fact that in 1929 the number of gas users—or rather the number of houses using gas—increased by no fewer than 236,310, and you will agree that signs of decay are not very evident in the gas industry.

Moreover, it must never be forgotten that the largest part of the annual increase in the use of gas is due to the fact that existing consumers are steadily increasing their consumption. Forty years ago gas was looked upon as a luxury; now, largely owing to the use of automatic meters, it has become a necessity in every home for cooking, for gas fires, and for hot water, even if electricity is used for lighting.

Possibly nothing emphasizes the popularity of gas more than the fact that, notwithstanding the large quantities used for commercial purposes, the cooking load from eleven o'clock to one o'clock on Sundays is the peak load in our undertaking.

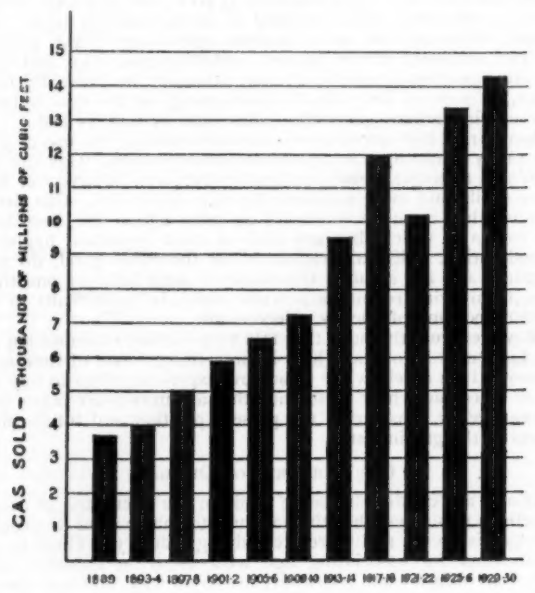
Diversity of Uses for Gas.

The value of gas both industrially and in the domestic sphere, is being recognized more widely every year, and this accounts for the steady progress and expansion of the gas industry even in these times of bad trade.

Birmingham has been called "the city of a thousand trades," and we know from information we have gathered that in Birmingham some 1200 different processes are carried on, in all of which heat is required. Many of these are in their very essence dependent on the existence of gaseous fuel. If it were not available, a radical alteration in the process would be inevitable. The introduction of gaseous firing has also enormously improved the conditions of the workers and reduced the cost and time of production.

Policy of Birmingham Gas Committee.

The Birmingham Gas Department has done its utmost by its general policy and by the operation of its Industrial Research Laboratories to assist manufacturers to adopt modern methods. It is not too much to say that there are trades firmly established



Graph showing increase in gas sales in Birmingham during the past 40 years. Each column represents the gas sold in a period of 12 months ended March 31 (with the exception of 1889, when the records were closed on Dec. 31).

in our city to-day that would have gone elsewhere—even abroad—if it had not been for the skilled assistance given to manufacturers when their processes were being perfected.

This progressive policy is reflected in the great increase in output of gas from the Department. The annual output has increased since I became a member of the Birmingham Gas Committee in 1891 from 4000 million to over 14,000 million c.ft.

When one considers the enormous increase in the price of the gas industry's raw material—coal—one realizes how efficiently the modern gas-works is organized and what full advantage the gas engineer has taken of all improvements due to scientific research in both engineering and chemistry.

Gas in the Workers' Homes.

Having thus by our service policy assisted in finding employment for the workers, we have also done our utmost to supply on easy terms a convenient form of lighting and heating.

All conditions of people, from chefs in large hotels downwards, are ready to give a good word for the gas cooker, but it is to the working-class family that it has been the greatest boon of all. The working man's wife was always hampered by a small and probably inefficient range, which made heavy, dirty, and often exasperating work for her; also by lack of accommodation for fuel storage. The gas cooker has immensely simplified the provision of a hot breakfast, and put in her hands a really efficient cooking apparatus. She can now be a cook instead of a stoker, and have reasonable leisure in place of back-breaking toil.

Although we have for years past been exerting all our influence to induce landlords of court and terrace property in the city to have such premises piped for gas—our automatic meter system includes the provision of meter, lighting fittings, and cooker—there remained until recently a fairly large number of courts, and other cottage property, which was still without a gas supply. Early last year, therefore, we inaugurated a scheme whereby the Department installed the gas pipes in the house, and is recouped by setting the meter to give a reduced quantity of gas per penny until the liability is liquidated. This has been taken up enthusiastically by the tenants, and we have installed gas under this scheme in 18,000 houses, many of them in the poorest parts of the city.

Freedom of Individual Choice.

Everyone ought to have the opportunity of choosing between gas and electricity for lighting. No one ought to be compelled to use electricity if they do not want to. Such attempted compulsion by housing authorities is both unwise and unjust, and not infrequently results in the use of an oil lamp because gas is not available.

Gas is moreover so safe to use that fatal accidents from its employment (as distinct from suicides) are negligible. Its adoption in working homes has reduced to a tenth those caused by the cheap oil lamp, which was once a constant source of danger.

For lighting, many thrifty housewives prefer gas, as it possesses the advantage of giving considerable warmth as well as light, which is greatly appreciated by the working man's wife, who finds that she always gets value for both sides of the penny she puts in the slot meter.

We know that ill health, besides being a calamity for the individual, represents a definite loss to the community. It is estimated that £35,000,000 in wages is lost every year owing to ill health. Gas can assist in reducing ill health.

In hot weather the great convenience of a gas cooker enables milk to be readily sterilized; cooking can be done in small quantities and at any time, thus ensuring freshness of food, and freedom from hot weather diseases in infants and others; while the readiness with which hot water can be obtained makes for cleanliness and for prompt treatment in the case of illness.

In cold weather, gas helps in the fight against damp and chills, and its judicious use will give freedom from frozen and burst water pipes.

Smoke Abatement.

Throughout the year, the increased use of gas means less smoke and therefore a cleaner atmosphere, and gives the sun's rays—of which in this country we need all we can possibly get—the utmost chance to brighten and cleanse our cities. The gas industry also assists in the campaign for cleaner atmosphere by the production of an excellent smokeless fuel—gas coke.

In Birmingham, by supplying a dry coke carefully screened and sized, and by a well-organized campaign and canvass extending over several years, we have increased the use of gas coke in domestic premises very considerably. Now that the true value of sunlight is becoming known, a municipality can and should do much by encouraging the use of smokeless fuels. Possibly in the course of years the provision of grates for soft coal in new houses will be forbidden in our great cities; but before any legal steps are taken in that direction, the gas industry can do good work by educating the public in the use of gas coke, and municipalities might well take the lead by designing houses in which only smokeless fuels are catered for.

In the matter of air and light the present working class houses show a vast improvement upon their Victorian prototypes, and the next step forward is to make them smokeless as well.

May I also venture to express my satisfaction that in so many places attempts are now being made to prevent our gasholders from being blots upon the landscape by taking thought and trouble in the method of painting them. Any gesture of this kind is acceptable at the present time.

Gas and Refuse Disposal.

The use of these smokeless fuels represents another saving to municipalities in that it results in a great decrease in the

amount of ashes and cinders which have to be collected. Such a saving may be a very considerable one—for instance, in Birmingham it is estimated that a decrease in the refuse put into the dust bin of 1 lb. per household per day would result in a saving of £30,000 per annum to the city.

Although great improvement has taken place in the past few years in the marketing of our products—gas, coke, and tar—it was only last year that the Vice-Principal of the Birmingham University, Prof. F. W. Burstall, said that the greatest fault of the gas industry was its modesty.

It is difficult for us who are intimately connected with the gas industry to realize how little many people—otherwise well informed—know of the service that the gas industry has to offer. We must make it known that there are few ways in which money can be spent to-day which show so good a return as expenditure on gas.

What Municipalities Can Do.

Much can be accomplished by close co-operation and sympathetic working between the various corporation departments. For example, we want them to realize that by purchase of our residuals they are helping to reduce the price of gas.

In addition to using gas for street lighting, they can use coke for all heating apparatus in schools and other public buildings, sulphate of ammonia for agricultural land, parks, gardens, and so on, and tar for the roads.

In this latter connection much may be accomplished by friendly co-operation with the City Engineer and Surveyor, both as regards quality of tar used and the methods of its application in order to ensure the very best results. There are 179,000 miles of highways in this country, and the use of British tar on them would do much to improve employment while the market so obtained for tar products would be reflected in the price of gas. By supporting local industry in this way municipalities will assist themselves and also ensure an economical and non-skid road surface.

In regard to street lighting, it may be of interest to mention that we in Birmingham are at present engaged in carrying out special lighting experiments for the Public Works Department in a road where the trams are discontinued and the poles are available for lighting purposes. The gas Department and the Electric Supply Department have each been allotted three stretches of road, one portion to be lighted by lamps from brackets on every tramway pole, another portion with lamps suspended in the centre of the road and another portion by lamps from alternate poles.

The Public Works Committee who undertake the lighting of the city will decide what use is made of the respective methods of lighting, whether by gas or electricity.

A Bright Future.

The gas industry has still a great future before it; young men need not be afraid of making gas their life's work. On the engineering, chemical, and commercial sides, there is ample scope for brains and work, and there are many methods of enabling men to avail themselves of modern facilities of education, leading up to proficiency in the industry.

Of recent years in a quiet and unobtrusive way, much has been done by the gas industry in very many different directions, but much remains to be done to secure continued progress and excellence.

The fullest exploitation of the gas industry in its proper field will mean improved living conditions at home, improved working conditions in the factory, and improved figures in employment returns.

THE NEWS OF THE WEEK

Dividends are Announced by the Directors of Meters, Ltd., of Manchester, at the following rates for the current year: On the preference shares at the rate of 5½ p.ct. per annum; and on the ordinary shares at the rate of 5 p.ct. per annum.

Peebles Seamless Diaphragm.—In the course of the advertisement of Messrs. Peebles and Co., Ltd., dealing with their seamless diaphragms, appearing on p. 320 of last week's "Journal," it was stated that the joint was perfect at 40 lbs. pressure. This should, however, read 40 inches.

An Issue of £60,000 5 p.ct. irredeemable debenture stock is being offered for sale by tender by the Eastbourne Gas Company. The minimum price of issue is £95 per £100 stock, yielding at that price £5 5s. 3d. p.ct. Tenders, which must be for amounts of £50 and upwards in multiples of £50, must be lodged at the Company's Offices, 87, Terminus Road, Eastbourne, not later than noon on Wednesday, Nov. 12, 1930.

Having Regard to the Provisions of the Companies Act, 1929, which came into operation on Nov. 1, 1929, the Directors of the Oriental Gas Company have reviewed the Company's Articles of Association. They are advised that it is desirable in the interests of the Company to take this opportunity of bringing the existing Articles up to date, by cancelling some of them which have become ineffective by reason of the recent Act, and by altering others so as to bring them into conformity with the modern law and practice. They have accordingly convened an Extraordinary General Meeting of the Company for Nov. 19 next.

Ten Thousand Trade Buyers on four continents will receive the overseas advance catalogue of the British Industries Fair, with index in their own languages, at least a month before the Fair opens in London and Birmingham on Feb. 6 next. A later edition of 10,000 copies of the London catalogue will be handed out at Olympia to visitors from abroad, and the home buyers' edition, on sale at the Fair, will run to 30,000 copies, making in all a guaranteed circulation of 50,000. An advance edition of the catalogue of the Birmingham section of the Fair with index in nine languages is also to be circulated along with the London catalogue. Both are already in preparation. The languages to be used for the London and the Birmingham catalogues will be English, French, Spanish, Portuguese, Italian, German, Swedish, Danish, and Dutch.

New Gas Showrooms are to be opened at Hereford, and on Wednesday, Oct. 29, the Mayor laid the foundation stone of the new Municipal Buildings, of which a frontage is being reserved for the Showrooms.

The Tenders sent in for the £20,000 5 p.ct. perpetual debenture stock which Messrs. A. & W. Richards offered on behalf of the Directors of the Bedford District Gas Company were opened on Oct. 28. The total amount applied for was £74,950 at prices ranging from £100 1s. down to the minimum of £95 per £100, the average price obtained being £96 18s. 4d. p.ct.

Sales of Road Tar in Germany have increased from 3000 tons in 1924 to about 130,000 tons in 1929. But even this latter-mentioned figure represents a total considerably below that of the imported bitumen employed. In order to stimulate the consumption of German road tar, the special Reichstag Committee, which granted 100 million marks for road work on July 15, in an effort to alleviate the German unemployment position, has made it a condition that only German material, particularly stone and tar, should be used.

Substantial Rumours are current of several pending absorptions of other undertakings by the Aldershot Gas, Water, and District Lighting Company, of which Mr. R. W. Edwards, J.P., is Chairman and Managing Director, and of the probability of a Bill being presented to Parliament this month for the acquisition of still wider powers. No doubt this will mean an issue of fresh capital in the near future, and readers will do well to watch the opportunity of investing in a concern in which progress, service, and skilful management are so prominently combined.

The New Vertical Retort Installation for Newcastle-under-Lyme is to be proceeded with at a cost of £20,000 in consequence of the Ministry of Labour having approved an Exchequer Grant. Conditions of the grant are: (*a*) As far as practicable only married men or men with dependants shall be employed on the work; and (*b*) the work must be actively commenced by Nov. 17, 1930, and completed within ten months of commencement. The Town Clerk, who had been instructed to apply for a further grant, in order that the number of retorts may be increased from six to eight, informed the Council that a tender had been accepted and arrangements made to commence the work at the earliest moment.

THE NEWS—continued.

A Further Amalgamation.

The "Financial Times" for Monday last stated that the Watford and St. Albans Gas Company, which in March last applied for an Order to acquire the Elstree and Boreham Wood Gas Company, now seeks to take over the Hemel Hempsted District Gas Company.

The Watford Company proposes to increase its capital, and the acquisition will be effected by an exchange of stock on the following basis:

£167 of Watford ordinary stock for every £100 of Hemel Hempstead "A" and "B" 10 p.ct. standard stock.

£116 18s. of ordinary stock for every £100 of 7 p.ct. standard "C" stock.

£120 of 5 p.ct. preference for every £100 of 6 p.ct. preference stock.

Hemel Hempsted mortgage bonds amounting to £8100 and 6 p.ct. redeemable debenture stock totalling £18,400 will be paid off at par.

The Company to be acquired was incorporated in 1878 and supplies Hemel Hempsted, Boxmoor, King's Langley, Abbots Langley, Bovingdon, and parts of the parishes of Northchurch, Great Gaddesden, Flamstead, and Redbourne. The authorized capital is £121,550, of which £67,648 is paid up.

Educational Courses for Coke Oven Workers.

The West Riding of Yorkshire County Advisory Committee for Further Education recently formed a Committee to consider Educational Courses for Coke Oven Workers. This Committee recommended that a course of about six semi-popular lectures should be given at each of the evening-class centres with a view to stimulating interest in the hope that men would subsequently take more detailed courses in chemistry and other subjects connected with coke oven work. The first centre to arrange such a course was Rotherham, where the surprisingly large number of 137 men enrolled.

At this Centre, Mr. G. J. Greenfield, M.Sc., A.R.C.S., is the lecturer, and the following is the syllabus of the course:

Lecture I. Converting coal into coke. What happens in the coke oven to (*a*) the coal, (*b*) the gas. Development of design.
Lecture II. Control of temperatures; present-day designs; what happens in the flues; uses of coke oven gas.
Lecture III. Operation of ovens; compressed *v.* top charging; bench *v.* central quenching; dry cooling; coke handling equipment; uses of coke.
Lecture IV. Gas coolers; exhausters; recovery of tar; tar and tar products.
Lecture V. Recovery of sulphate of ammonia: (*a*) Indirect, (*b*) direct, (*c*) semi-direct. Uses of ammonia.
Lecture VI. Recovery of benzole; refining of benzole. Uses of benzole and benzole products.

A similar course is commencing at Barnsley, the lecturer being Mr. A. C. Middleton, Manager of Rotherham Main.

Institution of Chemical Engineers.

1930 Associate-Membership Examination.

The following extracts are from the Report of the Board of Examiners.

At this, the fifth, public examination in chemical engineering, four candidates took the full examination, and two candidates were required to answer papers A and B only. The method of examination was exactly the same as in the year 1929, the general arrangement and choice of questions being on the same lines as in previous years. In general, it was considered that the answers to the fundamental questions showed considerable improvement in comparison with previous years, but some of the London papers were poorly answered, and, in particular, the compulsory question relating to materials of construction seemed to give great difficulty to the candidates. The answer to the drawing question was satisfactory, and it is suggested that in future years the difficulty of these problems might be progressively increased.

The impression gained is that the requirements of the Institution are becoming better known and that the standard of the work submitted shows improvement; the importance attached by the examiners to the fundamental aspects of the questions is being recognized. Generally, the candidates prefer to solve mathematical problems by cumbrous methods rather than by the use of the calculus, and the attention of candidates might well be directed to this point.

The *viva voce* examination has been found to be useful, in that it enables the examiners to judge the abilities of the candidates and to supplement the information given in the written papers in what they consider to be important particulars.

Of the candidates submitting themselves for examination, the following satisfied the examiners: Arthur Briggs, Kenneth Francis Carmichael, Thomas Pride Dee, and Robert Tollitt.

Influence of Furnace Atmosphere in Metal Heating.

At a joint meeting of the Yorkshire and Fuel Sections of the Society of Chemical Industry held in Leeds on Monday evening, Oct. 27, two papers were read and discussed. One of these dealt with the influence of different furnace atmospheres in the heating of metals, particularly steel (by Dr. W. H. Blackburn and Prof. J. W. Cobb, of the Fuel Department, the University of Leeds), describing laboratory experiments in which typical furnace atmospheres had been reproduced. It was shown in the first instance to be of paramount importance that free oxygen should not reach the surface of the hot metal, indicating the necessity of not using more air than was necessary to complete combustion and an accompanying necessity of so designing and working the furnace that combustion was complete before the furnace gases impinged upon the metal.

It was also shown that a fuel rich in carbon and poor in hydrogen, as, for example, dry coke used in a fire or gas producer blown with air and no steam, produced definitely less scale than a fuel richer in hydrogen, such as oil or bituminous coal. The comparative value of different gases which might be used as anti-scaling agents, such as hydrogen, carbon monoxide, methane, ethylene, and acetylene, was also discussed, and it was shown that for the complete prevention of scaling, quantities of these gases were required which would only be commercially practicable in very special cases.

Perhaps the most interesting conclusion arose in special experiments in which it was shown that the free carbon suspended in the atmosphere of a furnace working with a smoky flame played little or no part in making that flame protective against scaling, the protection being due to the reducing gases present. There seemed from these experiments to be no ground for the common assumption that a smoky flame from bituminous coal is more effective in minimizing scale than a clean reducing flame from coke, which latter would indeed tend to be more protective on account of its lower content of water vapour.

Forthcoming Engagements.

Nov. 8.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Joint Meeting with Western District, Edinburgh. Address by Mr. D. Warden, of Dundee.

Nov. 8.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—See Eastern District above.

Nov. 11.—INSTITUTION OF GAS ENGINEERS.—Meeting of Education Executive Committee, 4 p.m., at 28, Grosvenor Gardens, S.W. 1.

Nov. 11.—NATIONAL GAS COUNCIL.—Meeting of the Central Executive Board, 28, Grosvenor Gardens, S.W. 1, 2.30 p.m.

Nov. 13.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting at 2 p.m. Discussion of Education Scheme for Gas Salesmen.

Nov. 13.—MIDLAND JUNIOR GAS ASSOCIATION.—W. E. Benton on "Oven Temperature Control and Design of a Bi-metal Thermostat."

Nov. 15.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Coatbridge Gas-Works.

Nov. 15.—WESTERN JUNIOR GAS ASSOCIATION.—Meeting at Bath.

Nov. 18.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, at 2.30 p.m.

Nov. 19.—SOCIETY OF BRITISH GAS INDUSTRIES.—Meeting of the Council in the morning at 56, Victoria Street, S.W. 1.

Nov. 19.—SOCIETY OF BRITISH GAS INDUSTRIES.—Autumn General Meeting in London.

Nov. 19.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the Executive Committee at 11.30 a.m.

Nov. 19.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the General Committee at 2.30 p.m.

Nov. 21.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—General Meeting in London.

Nov. 21.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—J. M. Webber, "Electrical Plant as Applied to Gas-Works."

Nov. 21.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Beattie's Bakery, Dennistoun, Glasgow.

Nov. 22.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Bradford.

Nov. 24.—INSTITUTION OF GAS ENGINEERS.—Meetings of Executive Committee, 2 p.m.; Finance Committee, 3.30 p.m.; Council, 4 p.m.; at 28, Grosvenor Gardens, S.W. 1.

Nov. 25-26.—INSTITUTION OF GAS ENGINEERS.—Autumn Meeting at the Incorporated Accountants' Hall, Victoria Embankment, W.C. 2.

Nov. 29.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION (AUXILIARY SECTION).—Meeting at the Gas Office, Newcastle-on-Tyne, 2.30.

Legal Intelligence

Collision in the Thames.

The Gas Light and Coke Company were defendants in the Admiralty Division on Oct. 29 to a claim by the owners of a barge called the "Kingston," who alleged that the Company's s.s. "Suntrap" had caused damage to the "Kingston" through a collision in Limehouse Reach in March last. It was alleged by the Gas Light and Coke Company that the collision was due to the negligence of the Master of the plaintiff's tug "Kettle," which was towing the barge, and the Company counterclaimed for damages to their vessel. The "Kingston" was being towed with other barges, and was turning to an unloading station. She was struck by the "Suntrap" at full speed, with the result that she was severely damaged and sunk. The "Suntrap," it was alleged, was not keeping a proper lookout.

The President of the Admiralty Division with Trinity Masters held that the "Suntrap" was to blame and gave judgment for the owners of the "Kingston."

Trade Notes.

Lewenz & Wilkinson, Ltd.

Messrs. Lewenz & Wilkinson, Ltd., Engineers and Merchants, announce that they have recently moved into larger offices at 74, Victoria Street, S.W. 1, and their telephone number is now Victoria 1753/4.

Jackson Boilers, Ltd., New Address.

Of late years the "Jackson" products have become so well-known and so universally adopted by the catering and allied trades that larger and more modern premises have again become a necessity. These have been acquired, reconstructed, and modernized, and the Head Office and Works are now situated at Vulcan Works, Shafton Lane, Holbeck, Leeds.

Kempton's Latest Gas Appliance Catalogue.

Messrs. C. H. Kempton & Co., Ltd., Gas Lighting and Maintenance Contractors, of Stangate House, Westminster Bridge Road, London, S.E. 1, have published a profusely illustrated catalogue of public lighting and gas fittings. In addition to outdoor and indoor lamps and burners of all types, the list includes enamelled plates for cookers, ceiling protectors, boiler lids, and a remarkable selection of silk shades and bead fringes. Heat-resisting glassware is also featured.

Coal Cleaning Plant for Thorncliffe.

The Clean Coal Company, Ltd., have received an order from Messrs. Newton, Chambers, & Co., Ltd., of Sheffield, for a complete coal cleaning plant operating under the "C.C." patent system. This plant will supply clean coal to the battery of modern coke ovens recently erected by Messrs. Thorncliffe Coal Distillation, Ltd., at Smithy Wood, South Yorkshire.

A New Abbott, Birks, & Co. Catalogue.

A catalogue recently issued by Messrs. Abbott, Birks, & Co., of 113, Newington Causeway, S.E. 1, deals in a most comprehensive manner, to the extent of 113 pages, with every description of tools and equipment for gas, water, and electricity undertakings, main-laying and contractors, railway and steamship stores, &c. A full index is included at the beginning of the catalogue.

Turbine High-Speed Sifting.

The S.O.S. Patents Company, Ltd., of 156, Charing Cross Road, W.C. 2, have published a folder dealing with their high-speed turbine sifting machine. This machine is capable of extremely high outputs, and is economical both to run and maintain. Briefly, it consists of two superimposed turbines mounted on a common vertical axis. The profile of the blades allows every particle of the product to strike the cloths at a constant angle. Each machine is fitted with a specially devised distributor, suitable for all products, and ensuring even distribution and supply of raw material to the turbines by a simple adjustment which can be made while the machine is in motion.

Coal and Coke Crushing.

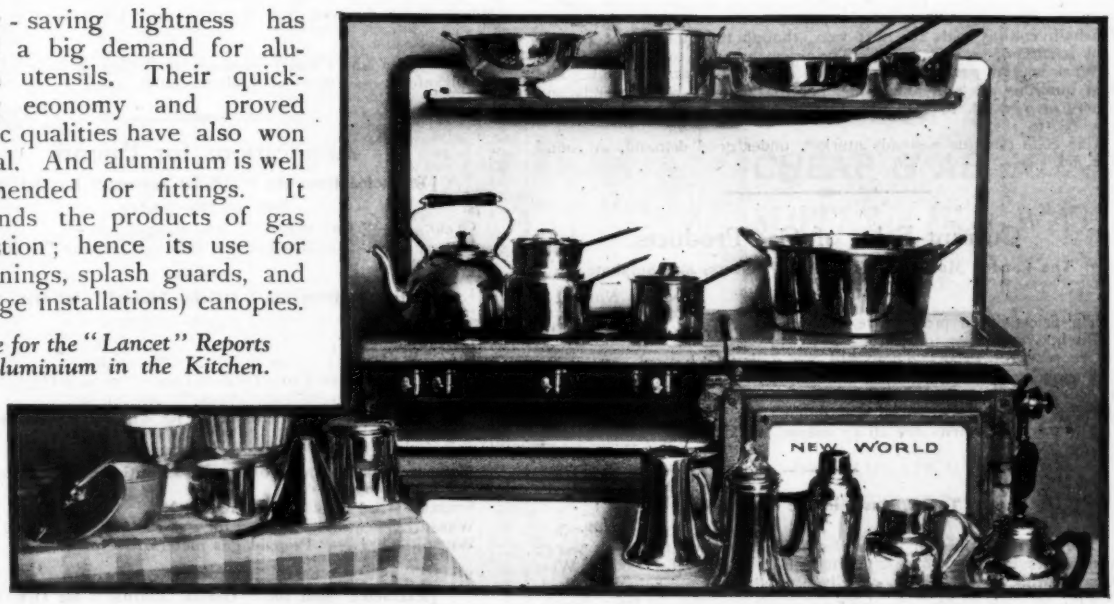
A coal and coke crusher illustrated in a folder published by the patentees, Lozai-Lerciu, France, is claimed to have proved itself most efficient at collieries and coke ovens, in France and other countries. This crusher consists of two moving heads, driven by a two-crank shaft and fitted with vertical picks which make contact with the products dealt with, alternatively, thus giving uniformity of motion. The first moving head, situated at the side where the products to be crushed enter the crusher, is fitted with short picks spaced to chip the larger lumps of coal or coke. The second head is fitted with closer spaced picks as called for by the size of product required. The heads are interchangeable and the picks are easily changed. The products to be crushed are fed to the picks by means of a push-plate conveyor revolving on a strong flat table jointed at one side and supported on powerful springs immediately under the point where crushing takes place. The products are thus fed continuously by the conveyor, and should any hard unbreakable foreign substance be fed on the table, the conveyor and table are automatically repelled, thus avoiding broken picks, &c.

G.J. 5.11.30.

Gains for Utensils and Fittings

Labour-saving lightness has created a big demand for aluminium utensils. Their quick-heating economy and proved hygienic qualities have also won approval. And aluminium is well recommended for fittings. It withstands the products of gas combustion; hence its use for oven linings, splash guards, and (for large installations) canopies.

Write for the "Lancet" Reports on Aluminium in the Kitchen.



"Diamond" aluminium utensils illustrated by courtesy of the London Aluminium Co., Ltd.

Aluminium

THE BRITISH ALUMINIUM CO. LTD.
ALUMINIUM PRODUCERS. ADELAIDE HOUSE. KING WILLIAM STREET. LONDON E.C.4

London Warehouse: 84-88, Banner St., Golden Lane, E.C. 1. Birmingham: 21, Barwick St. Leeds: 66, Kirkstall Rd. Manchester: 274, Deansgate. Newcastle: Milburn House. Glasgow: 113, West Regent St.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Gas stocks and shares continued in good demand last week, and a further batch of improvements in value was recorded. The bulk of the business centred round the new Gas Light and Coke Company's 4½ p.ct. debenture issue, which closed on Friday last at 2⅛ premium. Sutton ordinary headed the list of increases with a rise of 6 points to 115-120. This Company has distributed 8 p.ct. for the past three years, and at this rate the yield on the current price is £6 16s. 2d. p.ct., so that the higher price is amply justified. The stock, however, is closely held and rarely comes into the market. It is satisfactory to note that the Newcastle and Gateshead Company's £1 units showed a further improvement last week on the local Exchange, rising by 6d. to 16s. 3d.-16s. 9d., making a total increase of 9d. in the past fortnight. Two other stocks which improved on the local Exchanges were the Bristol 5 p.ct. maximum and Sheffield consolidated. The former hardened 1½ points to 91-93, and the latter, following a rise of 1½ points the previous week, gained a further 2 points to 104-106. The South Metropolitan ordinary and 3 p.ct. debenture stocks both advanced a point to 103-105 and 60-63 respectively; and Aldershot 4 p.ct. preference at 69-72 and Wandsworth 5 p.ct. preference at 91-94 also showed gains of 1 point each. The only fall in value last week was a drop of 2 points, to 2-3, in the £10 shares of the Tuscan Gas Company, Ltd.

The Directors of the Oriental Gas Company have announced a final dividend of 4½ p.ct., making 8 p.ct. for the year to June 30 last; a rate which has been paid for many years past.

Coal Markets.

Though the general terms of some of the marketing schemes are known, there are still details of quotas and minimum prices to be fixed, and in the meantime no progress is being made with forward business, especially in the export markets. Generally speaking, prompt trading has been slightly brisker in the past week due to seasonal demand, but everywhere it is still far below normal. Orders for Durham gas coals, especially the superior sorts, showed some improvement last week, and the extra demand with greatly curtailed present production gave rise to a firmer feeling, but without noticeable effect on prices. There was good news on the Newcastle market that the French railways have placed their customary order for Durham coking coals for next year, though the quantity of 400,000 tons is rather less than usual. The prices are 13s. to 13s. 6d. f.o.b.

Wear special gas coals are quoted at 15s. to 15s. 3d. f.o.b., and best qualities are still about 14s. 6d. to 14s. 9d., with seconds and others at 12s. 6d. to 13s. 3d. Yorkshire screened gas for export is 16s. 6d. to 18s.

Gas coke remains a steady market, under good demand, at round 21s. 6d.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 3.

The prices of tar products remain unchanged, and are as follows:

Pitch, 47s. 6d. per ton f.o.b.

Creosote, for export, 6d. to 6¼d. per gallon f.o.b.

Pure toluole, 2s. to 2s. 1d. per gallon; pure benzole, 1s. 8d. to 1s. 9d. per gallon; 95/160 solvent naphtha, about 1s. 5d. per gallon; pyridine bases, about 3s. 9d. per gallon.

The prices of spirits are all *ex* sellers' works.

Tar Products in the Provinces.

Nov. 3.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 24s. Pitch—East Coast, 46s. f.o.b. West Coast, Manchester, Liverpool, Clyde, 46s. f.o.b.* Toluole, naked, North, 1s. 6½d. to 1s. 7½d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 2⅛d. to 1s. 2⅜d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3⅛d. to 3⅜d.; low gravity, 1⅛d.; Scotland, 3⅛d. to 3⅜d. Heavy oils, in bulk, North, 5⅛d. to 6d. Carbolic acid, 60's, 1s. 4½d. to 1s. 6d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Nov.* 1.

The market continues unstable, although the output of some products has increased considerably during the week. Quotations remain without alteration.

Pitch.—Inquiries are plentiful, but orders are scarce. Nominal export price is unchanged at 45s. to 47s. 6d. per ton f.o.b. Glasgow. Home value is steady at 45s. per ton f.o.r.

Refined tar to Ministry of Transport Specification is now being inquired for in fair quantities for forward delivery. Quotations remain at 3d. to 3⅛d. per gallon f.o.r. in buyers' packages.

Creosote.—The throughput is increasing, but quotations are unaffected. B.E.S.A. Specification is 2⅝d. to 3¼d. per gallon; low gravity, 3d. to 3⅛d. per gallon; and neutral oil, 3d. to 3¼d. per gallon—all in bulk quantities f.o.r. makers' works.

Cresylic.—Some fair-sized orders have been placed. Pale, 97/99 p.ct., is 1s. 6⅝d. to 1s. 7⅞d. per gallon; dark, 97/99 p.ct., 1s. 5⅜d. to 1s. 6⅜d. per gallon; and pale, 99/100 p.ct., 1s. 8⅜d. to 1s. 9⅜d. per gallon—all f.o.r. makers' works.

Crude naphtha.—The value remains steady at 4d. to 4½d. per gallon.

Solvent naphtha.—Orders are scarce. 90/160 is about 1s. 2½d. to 1s. 3d. per gallon, and 90/190, about 1s. to 1s. 0½d. per gallon.

Motor benzole.—Stocks are increasing in this area. Quotations are about 1s. 5d. per gallon, but there are few buyers at this level.

Pyridines are unchanged; 90/160 being 3s. to 3s. 3d. per gallon.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.	s. d.	
Crude benzole	0 8	to 0 9	per gallon at works
Motor ,,	1 3½	,, 1 4½	,, ,, ,,
Pure ,,	1 8	,, 1 9	,, ,, ,,

Contracts Advertised To-Day.

Coal.

The Gas Committee of the County Borough of Burton-upon-Trent invite tenders for the supply of gas coal. [Advert. on p. 424.]

Cookers, Stoves, &c.

The City and County Borough of Belfast invite tenders for the supply of gas cookers, heating stoves, &c. [Advert. on p. 424.]

Meters.

The City and County Borough of Belfast invite tenders for the supply of dry gas meters. [Advert. on p. 424.]

Applications for Patents.

[Extracted from the "Official Journal" for Oct. 15.]

Nos. 29,770—30,514.

CLARK, T.—"Gas stoves." No. 29,973.

HELPS, G.—"Combination gas fires and cookers." No. 30,217.

[Extracted from the "Official Journal" for Oct. 22.]

Nos. 30,515—31,333.

BRADDOCK, T. C.—"Gas meters." No. 30,801.

BROMLEY, H. H.—"Gas fittings." No. 30,609.

GAS CHAMBERS AND COKE OVENS, LTD. (COLLIN & CO.).—"Chequer blocks for regenerative coke ovens." No. 31,095.

GLOVER & CO., LTD., T.—"Dial for indicating, &c., apparatus." No. 30,724.

METERS, LTD.—See Braddock, T. C. No. 30,801.

SPENCER THERMOSTAT COMPANY.—"Ignition systems for gas burners." No. 30,764.

STEELE, H.—"Gas-fired ovens." No. 30,803.

WEBER, A.—"Safety devices for gas cookers, &c." No. 31,157.

WILSON, D. L.—"Prepaid gas meters." No. 31,242.

[Extracted from the "Official Journal" for Oct. 29.]

Nos. 31,334—32,145.

FORSTER, J. D.—"Coin-freed gas meters." No. 31,771.

GAS CHAMBERS AND COKE OVENS, LTD.—"Liquid seals." No. 31,555.

HUMPHREYS & GLASGOW, LTD.—"Process of making carburetted water gas." Nos. 31,394, 31,396.

HUMPHREYS & GLASGOW, LTD.—"Manufacture of carburetted water gas." No. 31,395.

HUMPHREYS & GLASGOW, LTD.—"Valves." No. 31,397.

METROPOLITAN GAS METERS, LTD.—See Forster, J. D. No. 31,771.

PRIEST, C. F.—"Gas-fired reheating furnaces." No. 32,051.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 31.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C. .	78—78	..	..
522,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	69—72	+1	70½
1,551,868	,,	Oct. 9	7⅞	7⅞	Alliance & Dublin Ord. . .	93—96	..	95—95⅞
374,000	,,	July 10	4	4	Do. 4 p.c. Deb. . . .	63—66	..	..
522,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c. . . .	107—110	..	..
300,000	1	Oct. 23	1/4⅛	1/7⅛	Bombay, Ltd.	15/6 17/6	..	..
174,500	10	Aug. 14	9	9	Bournemouth 5 p.c. . . .	14—15	..	..
500,050	10	,,	7	7	Do. B 7 p.c. . .	12½—12⅝	..	..
439,160	10	,,	6	6	Do. Pref. 6 p.c. .	11—11¼	..	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb. .	57—60	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	75—78	..	..
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con.	112—117	..	113½—114
371,880	,,	,,	6⅔	6⅔	Do. 5 p.c. Con.	101—104	..	..
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	91—93*a*	+1½	..
855,000	,,	Sept. 25	8	7	British Ord.	108—113	..	111½—112
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	112—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. . .	72—75	..	..
450 000	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	95—98	..	..
100.000	,,	June 26	5	5	Cambridge 5 p.c. Deb. . .	95—98	..	..
100,000	10	May 22	6	10	Cape Town, Ltd.	9—10	..	..
100,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. . .	6½—7½	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. . .	71—76	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	95—98	..	..
287,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb. .	98—101	..	..
157,150	,,	Aug. 14	6⅔	5	Chester 5 p.c. Ord.	86—91*b*	..	..
98,936	1	Oct. 9	†2/-	†2/-	Colombo, Ltd. Ord. . . .	32/—34/-	..	..
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. .	18/—20/-	..	..
609,204	1	Oct. 9	1/9⅜	1/4⅜	Colonial Gas Assn. Ld. Ord	16/6—18/6	..	18/—18/6
296,053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	18/—20/-	..	..
2,073,280	Stk.	July 24	7	6	Commercial Ord.	94—97	..	95½—96⅞
475,000	,,	June 26	3	3	Do. 3 p.c. Deb. . .	57—60	..	60
787,560	,,	Aug. 14	7	7	Croydon sliding scale . .	104—107	..	106½
453,100	,,	,,	5	5	Do. max. div. . . .	81—84	..	..
542,270	,,	Aug. 14	10	7	Derby Con.	115—125*e*	..	..
55,000	,,	June 26	4	4	Do. Deb.	65—70*e*	..	..
209,000	,,	Aug. 28	5	5	East Hull Ord. 5 p.c. . . .	69—71	..	..
1,002,180	,,	Sept. 25	†7*g*	†4	European, Ltd.	103—113	..	103—109
18,629,125	,,	July 24	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	19/6—20/-*f*	..	19/4¼—20/-
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	63—65	..	64½—65
4,157.020	,,	,,	4	4	Do. 4 p.c. Con. Pref. . .	78—81	..	80 80½
5,602,620	,,	June 26	3	3	Do. 3 p.c. Con. Deb. . .	60—63	..	62
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	100—103	..	102
161,450	,,	Sept. 11	10	10	Harrogate Cons. 10 p.c. max.	155—160	..	..
82,500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	97—102	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	..
70,000	10	Oct. 9	⅛	10	Hongkong & China, Ltd. .	13—14	..	..
213,200	Stk.	Aug. 14	6	6	Hornsey Con. 3½ p.c. . . .	88—91	..	..
2 436,594	,,	May 22	10	25	Imperial Continental Cap. .	345—365	..	352—362
223,130	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	50—85	..	58—84
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord. . .	123—128	..	..
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord. . . .	95—96*b*	..	..
600.000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref. .	97¼—99½*b*	..	..
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap. . .	120—125	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb. . .	51—54	..	..
75,000	5	June 26	†10	110	Malta & Mediterranean . .	5¼—6	..	..
892,000	—	Oct. 1	5¼	5¼	Metrop'itan (of Melbourne) 5½ p.c. Red. Deb. . . .	88—91	..	..
675,000	Stk.	May 22	†6	18	Montevideo, Ltd.	100—110	..	103
2,061,315	,,	July 24	5⅔	5	Newcastle & Gateshead Con.	16/3—16/9*df*	+-/6	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref. .	71½—72½*d*	..	..
691,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb. .	67½—68½*d*	..	..
169,940	,,	Aug. 28	7¼	7¼	North Middlesex 6 p.c. Con.	106—111	..	..
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max. .	76—81	..	..
300.000	,,	Apl. 24	9	7	Oriental, Ltd.	108—113	..	..
60.000	5	13 My., '15	—	—	Ottoman	0—¼	..	..
205,162	Stk.	June 26	8	8	Plym'th & Stonehouse 5 p.c.	110 115	..	..
424,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Std	107—112	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max. . .	77—80	..	..
186,000	100	June 2	4	4	Primitiva 4 p.c. Red. Deb. .	96—99	..	..
677,837	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	83—86	..	..
371,495	,,	June 26	4	4	Do. 4 p.c. Cons. Deb. .	83—86	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref. . .	8¼—8⅝	..	..
1,736,968	Stk.	Aug. 28	6½	6½	Sheffield Cons.	104—106*a*	+2	..
95,000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—78*e*	..	..
90,000	10	June 5	‡4	‡5	South African	4—6	..	..
6.709.895	Stk.	Aug. 14	7½	5	South Met. Ord.	103—105	+1	102¾—104
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	110—113	..	112—113
1,895.445	,,	July 10	3	3	Do. 3 p.c. Deb. . .	60—63	+1	61½—62½
734,000	,,	Sept. 11	6½	6½	Do. 6½ p.c. Red. Db.	99—102	..	..
91,500	,,	Aug. 14	8½	8½	South Shields Con. . . .	105—107*d*	..	..
1,549,795	,,	July 24	6⅔	6⅔	South Suburban Ord. 5 p.c.	100—103	..	..
468,837	,,	June 26	5	5	Do. 5 p.c. Deb.	95—98	..	..
647,740	,,	Aug. 28	5	5	Southampton Ord. 5 p.c. max.	75—78	..	..
121,375	,,	June 26	4	4	Do. 4 p.c. Deb.	73—76	..	..
179,014	,,	July 24	8	8	Sutton Ord.	115—120	+6	..
94,500	,,	June 26	5	5	Do. 5 p.c. Deb. . .	93—96	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref. .	98—101	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb. .	102—105	..	..
1,076,490	,,	July 24	6⅔	6⅔	Tottenham District Ord. .	103—106	..	103—104⅔
150,000	,,	,,	5⅓	5⅓	Do. 5½ p.c. Pref. . .	95—98	..	..
199,005	,,	June 26	4	4	Do. 4 p.c. Deb. . .	75—78	..	..
182,380	10	30 Dec., '12	—	—	Tuscan, Ltd.	2—3	—⅛	2
85,701	Stk.	Sept. 25	6	6	Do. 6 p.c. Red. Deb.	73—78	..	..
309,094	,,	Aug. 28	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95—100	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref. . .	85—90	..	..
1,180,970	,,	July 10	—	7	Wandsworth, Wimbledon, and Epsom Cons. . .	107—112	..	109½—110½
200,000	,,	,,	5	5	Do. 5 p.c. Pref.	91—94	+1	92½—94
488,344	,,	June 26	5	5	Do. 5 p.c. Deb.	98—101	..	..

Quotations as:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of Stock. *g.*—Paid on £10 shares. * Ex. div. † Paid free of income-tax. ‡ For year. ‖ Div=10 p.ct. p.a. less tax and less tax on interim dividend.

GENERAL
IMMERSION
Indirect Water Heater

Unique and Different

Adoption means Progress

THE SECRET OF A CHEAP & ABUNDANT SUPPLY of HOT WATER

LOW INITIAL COST
LOW INSTALLATION COST
MINIMUM GAS CONSUMPTION
NEGLIGIBLE MAINTENANCE COSTS
HARD AND SOFT WATER TROUBLES DISAPPEAR
NO DISCOLORATION OF WATER
NO CORROSION OF INTERNAL FLUES
NO CONDENSATION
NO DEPOSITS IN FLUES OR BOILER
WORKS INDEPENDENTLY OR IN CONJUNCTION WITH THE RANGE BOILER

GENERAL GAS APPLIANCES LIMITED
Guide Bridge Manchester

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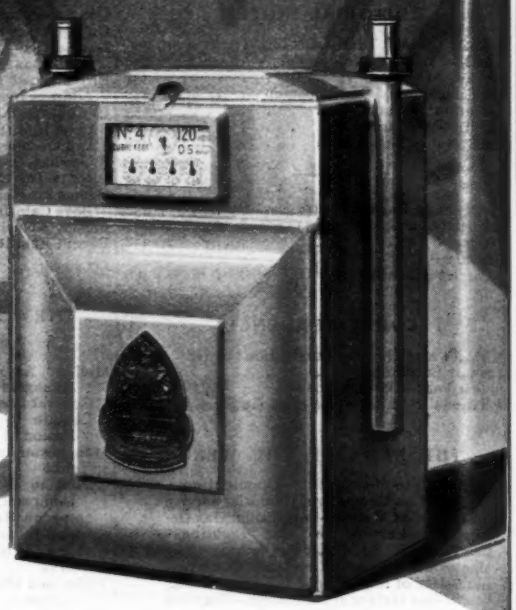

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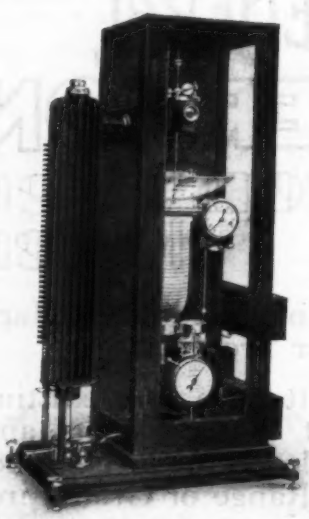

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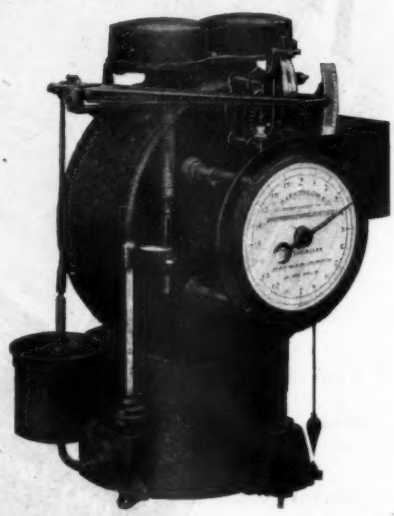

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